REPORT

of

The North Carolina Department of Agriculture

1944 - 1948

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REPORT

of

The North Carolina Department of Agriculture

FOR 1944-1948

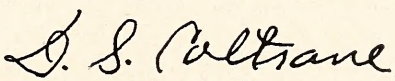
LETTER OF TRANSMITTAL

To His Excellency
The Governor of North Carolina

In compliance with the Statutes of North Carolina, I submit herewith a report of the work of the Department of Agriculture for the biennial periods 1944-46 and 1946-48.

The report for the 1944-46 biennium was not previously printed because of wartime printing difficulties. It has been combined with the report for the succeeding biennium; hence this volume covers the four-year period 1944-1948.

Respectfully,



Commissioner of Agriculture.

Raleigh, N. C.

December 22, 1948.

513373

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JUNE 30, 1948

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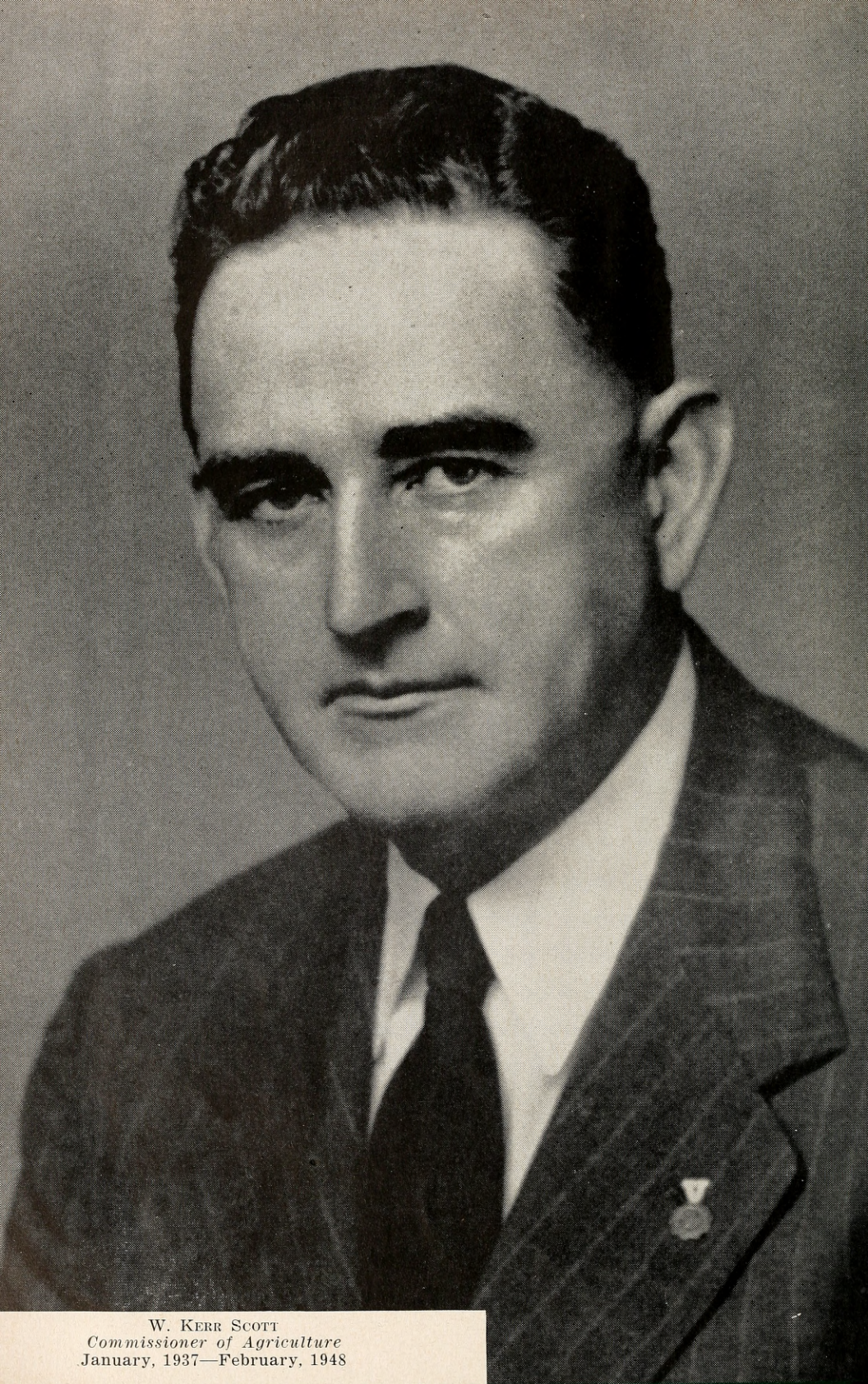

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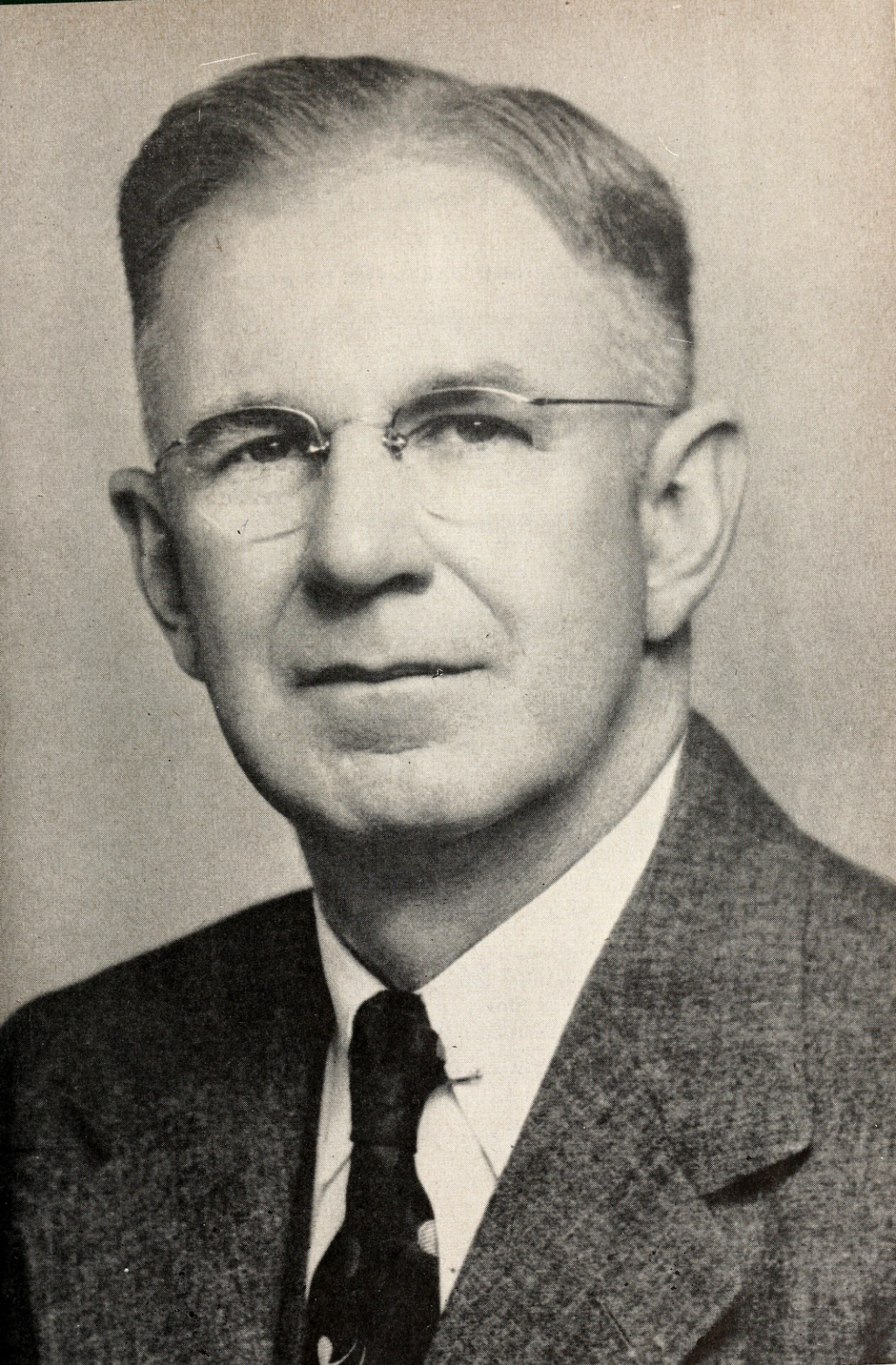
Commissioner of Agriculture
January, 1937—February, 1948



D. S. COLTRANE
Commissioner of Agriculture
February, 1948—January, 1949

QUADRENNIAL REPORT

OF THE

NORTH CAROLINA DEPARTMENT OF AGRICULTURE

By D. S. COLTRANE

Commissioner of Agriculture

The agriculture of North Carolina is definitely in the class of a big business, highly specialized in some respects and yet of a very diverse nature. Ranging from large, highly commercialized cotton, tobacco, peanut and truck farms in the East to dairy, poultry, small grain and general farms in the Piedmont, and to cattle, fruit and truck farms in the Mountains, a diversity of production is found which is unequaled in this country. Soil and climatic conditions encourage this wide range of production and hold potentialities for higher levels of farming activity.

Of North Carolina's 3,715,000 total population, 1,336,780 live on 304,000 farms which include a total of 21,583,740 acres of land. The value of all farm resources in 1945, including land, livestock, equipment, and other physical assets amounted to $1,373,000,000. The mere size of this total resources figure indicates the importance of the total farm plant. That this large investment yields well is verified by the fact that gross farm income reached the peak of $907,511,000 in 1946 and for 1947 it was $893,000,000. This is in contrast with the 1941 gross farm income of $381,925,000.

Equity held in the farm business by the farmer himself is very favorable, since total mortgage indebtedness in 1945 was $76,723,000. The 1930 mortgage indebtedness of North Carolina farmers was $111,880,000.

North Carolina Agriculture is characterized by its production of crops—2,138,000 acres of corn, 793,000 acres of tobacco, 647,000 acres of cotton, and large acreages of small grains, peanuts, soybeans, Irish potatoes, and other truck crops. Being primarily an agriculture of crops farming, it follows that the State is a large user of commercial fertilizer. Fertilizer tonnage sold in North Carolina in 1947 amounted to 1,560,000 tons.

Although the production of crops is highly important, livestock farming is growing in significance, this despite the fact that livestock numbers are decreasing. There are 376,000 milk

cows on farms and cattle of all types number 677,000. The 1948 estimate of swine on farms places the number at 1,191,000, and there are 35,000 head of sheep. It is estimated also in 1948 that there are 10,500,000 chickens and 50,000 turkeys on farms.

Livestock farming is growing in significance.

CHANGING TIMES

Any agency participating in the agricultural program of North Carolina can be justifiably proud of the progress which has been achieved during the years covered by this report. Advances have been registered in practically all phases of agriculture. New developments have uncovered possibilities hitherto deemed fantastic, and the upsurge of interest in scientific agriculture by the farmers as a whole has been one of the major happenings of our time. Fewer people engaged in farming and an increasing demand for products of the soil has accelerated the search for larger and more economical yields, for new and better ways of performing jobs in order to save and more fully utilize labor and equipment, for more adequate controls of plant and animal diseases and parasites, and for improvement in methods of distribution. So great has been the urge for improving methods, that at times the search has seemed almost frantic, but not without due consideration for sound approaches to the problems at hand.

Any reference to progress in North Carolina agriculture would likely begin with corn which is the State's largest single crop,

accounting for 2,138,000 acres in 1947 and producing over 65 million bushels of grain. The yield has increased at an amazingly high rate, from 22.8 bushels per acre in 1944 to 30.5 bushels per acre in 1947 and to an estimated 33 bushels per acre in 1948. The increasing use of adapted hybrid varieties, plus more adequate fertilization, and better cultivation and management practices have been the major factors.

Although not so readily measured as corn yields, it is generally agreed that the pasture improvement program in North Carolina has definitely found a sure footing and is now on its way to levels necessary for properly supporting our livestock industry. Realization on the part of individual farmers that pasture is just as much a crop as, say tobacco and corn, and that it requires fertilization and care as any other crop, is in a large measure

Prominent in pasture development is the fact that new grasses and legumes have been singled out, tested, tried successfully and found to be fitted to North Carolina climatic and soil conditions.

responsible for the success of this vital farm enterprise. Prominent in pasture development is the fact that new grasses and legumes have been singled out, tested, tried successfully and found to be fitted to North Carolina climatic and soil conditions.

Orchard grass, a pasture plant with an established reputation, has been found to be more valuable than ever grown in combination with the almost fabulous Ladino clover. Remarkable grazing records have been noted. Such grasses as the tall Fescues have also come into their own and have found a definite place in the new order of things.

During this period, investigations relating to flue-cured tobacco, our most important cash crop, were intensified and expanded. Development of disease resistant varieties was in the forefront of experimental endeavors. Receiving particular attention also were factors of quality in the cured leaf, and far-reaching steps in the development of new curing methods were made. Although tobacco has defied mechanization longer than other major crops, the use of machinery for cultivating and harvesting this crop is being studied and tried with increasing promise.

Types of tobacco other than flue-cured are also important to our economy. New developments in the production of Burley tobacco in the mountain counties may well be in the offing. Historically, this crop has been harvested by cutting the entire stalk and being allowed to air-cure. Trials have been conducted on priming the leaves and in the use of artificial heat for curing, both of which have been accomplished with good results. Turkish tobacco also is being produced successfully in the mountain counties and appears headed for a definite place in our cropping system.

Illustrations of progress in crop production in North Carolina could well continue indefinitely. To mention a few other important developments briefly, however, reference should be made to the experimental use of radioactive fertilizing elements, to the increasing use of chemicals for weed control in crop production, to new tillage methods, to the increasing use of cotton pickers and strippers as well as other farm machinery, to the increased use of irrigation systems, to the use of drying equipment for hay, corn, peanuts, and other field crops, and to the all important development by plant breeders of many improved varieties of all classes of crops.

The livestock industry of the State, growing in importance, has also given rise to many far-reaching changes. Artificial breeding has become well established and is growing rapidly. Something like twenty-five counties now have formed associations for handling this program. Being organized in this manner, female dairy animals owned by members may be bred to

the very best of bulls held at the central stud farm. Valuable to the livestock industry as a whole, this system is particularly important to the average-sized and small dairymen, who normally cannot afford to keep high-priced bulls.

This period also has noted an increased interest in cross-breeding, which has as its goal increased production of milk and meat and eggs at lower unit costs. This has been conducted with all classes of livestock and poultry and indications are that great things will come of the work. Notable advances also have been made in methods of feeding livestock, and in disease and parasite control.

It is logical to reason that with all the advances made in production practices, there would be a marked improvement in living conditions of farm people and this has been the case. Rural electrification is probably the one development which has led the way for better living and farming efficiency as well. In 1946 there were 250,000 rural power utility customers who were being served with 33,000 miles of distribution lines. Striking is this when contrasted with the year 1936, when there were only 12,000 rural customers being served by 2,300 miles of distribution lines. With the advent of electricity, additional electrical facilities are added, which serve to change the picture of farm life. Refrigerators, stoves, deep freeze units, washing machines and other items too numerous to list, are being acquired as conditions permit. Along with these and other conveniences, a new look is being given to farm homes and other buildings by remodeling and by painting. It all points up to a better day for people on the farm.

PLACE OF STATE DEPARTMENT OF AGRICULTURE

Progress which has been noted is the result of many factors. Most of all it is the result of teamwork, a team composed of farmers, businessmen, and all agricultural agencies serving farmers of the State, all with a determination to work together for the improvement of our economy. The Department of Agriculture is justly proud of its part in this program for bettering the agriculture of North Carolina. Serving to quite a large extent as an inspectional and regulatory agency, every effort has been made to carry out these functions in a manner which would benefit all citizens. Inspection service to protect consumers and assure them of quality products and to assure users of ferti-

lizers, feeds, seeds, and other like items that they are getting full value, has been of great importance.

Fundamental to our agriculture is the soil and its treatment. The Soil Testing Division of the Department has performed notable service in analyzing soil samples from all parts of the State and has made recommendations as to lime and fertilizer needs of fields from which samples were taken. The soil testing work and recommendations made are conducted in close cooperation with the North Carolina Agricultural Experiment Station. This

The Soil Testing Division has performed notable service in analyzing soil samples from all over the State.

laboratory has handled a large volume of work as indicated by its processing over 100,000 soil samples during the period 1944-1948.

FERTILIZER CONTROL

Following a knowledge of the soil it is imperative that fertilizers used be of the highest quality and of the guaranteed analyses. The fact that North Carolina uses more than one-seventh of all fertilizer sold in the Nation makes doubly important the Department's work in enforcing the Fertilizer Law. The program has been successful and has resulted in many beneficial changes in the fertilizer situation. Significant is the fact that

the number of fertilizer grades sold in North Carolina decreased from 202 in 1937 to 25 grades in 1947. With more attention being given to fewer grades, better quality is being obtained. The value of plant food per ton in excess of the guarantee has increased considerably and during the year 1946-1947, the average excess was worth 61 cents per ton which amounted to $1,017,370 for all fertilizer sold during that period.

By agreement of agencies involved, there has been an increase in the units of plant food per ton from an average of 15 to 19½,

Fertilizer samples drawn by the Department's inspectors are analyzed by the Division of Chemistry for content of the major plant food elements and also for the minor elements.

which assures economy for each fertilizer dollar. It is to be noted in connection with the trend to fertilizer grades of higher analysis that in 1947, 92% of the grades sold in the State were those recommended by the Agricultural Experiment Station, whereas in 1937, only about 28% of the grades sold were so recommended.

Fertilizer samples drawn by the Department's inspectors are analyzed by the Division of Chemistry for content of the major plant food elements and also for the minor elements. Although hampered at times by the lack of a full staff of inspectors, a determined effort has been made to get fertilizer samples from each company in proportion to the tonnage sold. As a rule a sample is taken for each 200 tons sold, but this ratio should be increased. For the biennium 1944-1946, there were 12,510 official samples and during the biennium 1946-1948 a total of 16,062 samples were drawn. These may be compared with the period 1942-1944 when 10,596 samples were used.

SUMMARY OF FERTILIZER CONTROL

	1944-1946	1946-1948	Total
Number of inspections	10,161	13,160	23,321
Number of official samples	12,510	16,062	28,572
Number of tons sampled	157,323	218,079	375,402
Number of "stop sales" issued	108	24	132
Number of penalties assessed	1,399	1,077*	2,476
Amount of penalties assessed	$49,154.32	$41,793.24*	$90,947.56
Amount paid to consumers	$13,916.91	$11,643.55*	$25,560.46
Amount paid to Department	$35,017.21	$26,784.73*	$61,801.94
Unpaid (as of 8-24-48)	$ 220.20	$ 3,364.96*	$ 3,585.16
Tax tag sales	3,011,061	3,274,241	6,285,302
Value of plant food received in excess of guarantee in 1944-45	.62¢ per ton or $909,091.74		
Value of plant food received in excess of guarantee in 1945-46	.43¢ per ton or $664,255.50		
Value of plant food received in excess of guarantee in 1946-47	.61¢ per ton or $1,017,370.20		

*These figures for the 1947-1948 year are incomplete.

FEED CONTROL

As the fertilizer we feed the soil is important, so is the feed we give livestock and poultry of great significance. The amended Feed Law of 1943 provides for further improvement in the quality of feeds offered for sale. The feed inspectors have sampled conscientiously and the Division of Chemistry has analyzed these samples carefully to determine that buyers of feed are getting what they pay for. The products of each company are sampled as far as possible and extra care is taken in

sampling brands which were previously found to be below the guarantee.

According to several measures, the quality of feed being sold is improving. During the period 1944-1948, the number of "stop sale" orders dropped from 238 in the first half to 106 in the second. For similar periods, the number of bags seized decreased from 21,475 to 6,955, and the number of bags returned to manufacturers decreased from 1259 to 717. Registrations cancelled were practically eliminated during the four-year period, changing from eleven during the first half to one during the second half. However, there was a slight increase in the total number of penalties assessed, from 544 in 1944-1946 to 611 in 1946-1948.

SUMMARY OF FEED CONTROL

	1944-1946	1946-1948	Total
Tax tag sales	1,676,308	1,569,488	3,245,796
Cottonseed meal tonnage	182,440	121,352	303,892
Number of inspections	27,097	20,939	48,036
Number of samples collected	4,100	4,410	8,510
Number of samples analyzed	4,579	4,950	9,529
Number of "stop sale" orders issued	238	106	344
Number of bags seized	21,475	6,955	28,430
Number of bags returned to manu.	1,259	717	1,976
Number of registrations cancelled	11	1	12
Number of penalties	544	611	1,155
Amount of penalties assessed	$12,964.69	$15,181.37	$28,146.06
Amount paid to consumers	$ 2,525.27	$ 1,820.07	$ 4,345.34
Amount paid to Department	$10,272.74	$12,586.21	$22,858.95
Unpaid (as of 8-24-48)	$ 166.68	$ 775.09	$ 941.77

SEED CONTROL

Closely allied with soil management and fertilization is the kind and quality of seeds that are planted. The Seed Laboratory was established primarily to carry out the Seed Law, however its work extends far beyond the scope of this Act. Much work is done in analyzing seed for germination and purity that are not directly involved in law enforcement. The service of this laboratory is growing in significance and value to farmers all the time. For the period covered by this report, 1944-1948, a total of 66,798 samples of seed were analyzed.

STATE KEPT FREE FROM FEDERAL QUARANTINE

The Division of Entomology by efficient inspection and control measures has performed a great service in keeping our

State free from Federal quarantine. This Division has done much to prevent the spread of diseases and insects for the protection of nurseries, flower growers, and fruit and vegetable farmers as well as the producers of other crops.

LIVESTOCK KEPT HEALTHY

The growing interest in livestock farming requires, in addition to provision for pastures, feeds, breeding, and management, close attention to contagious diseases and parasites. The Veterinary Division has devised inspections and control measures for the major diseases, the success of which is borne out by the good health of our livestock industry. Major livestock diseases which have received special attention by the Veterinary Division are: Bang's disease, Bovine tuberculosis, Anthrax, Hog cholera; and among poultry flocks, effective control work has been done with Pullorum disease. Also a close check has been made to detect any reappearance of the cattle fever tick.

The Dairy Division has worked diligently and thoroughly in conducting the Babcock test control programs. This is done largely through preventing variations of conditions when tests are made at the milk plants. In addition, the Dairy Division is concerned with the Milk Audit Law, and the Dairy Products Statistics Law, both of which provide measures of dairy developments in the State. Ice cream and other milk products also have been subject to regulations in which the Dairy Division is interested.

TEST FARMS BEING MECHANIZED

Particularly close to the progress of agriculture from the research standpoint is the Test Farms Division. Charged with the responsibility of administration of the seven farms owned by the Department of Agriculture, participation in the research program for North Carolina has been direct and significant. Furnishing physical facilities for the conduct of research projects by Experiment Station specialists, the opportunity has been afforded for closely coordinated teamwork. The increased research load on these farms calls for the very best of organization and management and presents a challenge for those concerned. Plans are underway to more completely mechanize operations on these farms and to bring all facilities up to a level which will more adequately serve the needs of the expanding research program.

MARKETING SERVICES PROVIDED

Even with the best of success in production, the farmer still has not achieved his goal until his products are sold at a fair price. For many years past, the feeling generally has been that marketing has not received consideration equal to that given production phases. The Division of Markets has worked in close cooperation with other State and Federal agencies to provide the proper channels for disposing of crops and livestock. Grading services have been provided, and a market news service has been in operation to keep growers informed. A number of marketing orders, particularly on Irish potatoes, are administered by the Markets Division and require much time of the personnel.

WAREHOUSE SUPERVISION

In the process of orderly marketing, it becomes necessary to provide storage for certain crops for varying periods of time. The Warehouse Division supervises the licensing of 89 warehouses having a capacity for 550,000 bales of cotton. Service also is provided in the classing of cotton held in such warehouses.

DEMAND FOR STATISTICS INCREASING

With a growing interest in the business side of farming, work of the Statistics Division increases in usefulness and importance. Statistical data are being used more and more as a foundation for sound planning and the demand for this data is increasing. Information collected by this Division is published in general and special reports for the benefit of farmers and businessmen alike, which among other things, informs the users of month-to-month condition of crops. Published reports are varied and their use is widespread.

FOOD INSPECTION WORK

Two important phases of the work done by the Division of Chemistry have already been reviewed. However, functions of this Division reach far beyond the analysis of fertilizers and feeds. Inspection service supporting the Food, Drug and Cosmetic Act is essential in assuring the output of clean and wholesome food products by bakeries, bottling plants, ice cream plants, and creamery and cheese factories. Inspection of places handling and storing food products has also been of great benefit to the

consuming public. Attention is directed at all times by this Division to adulteration, misbranding, and incorrect or insufficient labeling of food products.

ADMINISTRATION OF WEIGHTS AND MEASURES

The Weights and Measures Division is as the name implies, concerned largely with inspecting and testing devices used for weighing or measuring commodities for sale. Using approved

Immeasurable benefits have accrued to the consumer because of this service.

testing equipment, immeasurable benefits have been accrued to the consumer because of this service. During the past few years, much time has been given to the inspection and testing of tobacco curers and such items being placed on the market.

CREDIT UNIONS GROWING

The Credit Union Division carries out provisions of the Credit Union Law of 1915. It is designed to assist groups and communities to organize for the purpose of pooling financial resources which provides for savings on the one hand and loans on the other. During the four-year period, Credit Unions have increased in number from 25,006 to 41,909, and assets have increased from $2,527,916 to $7,169,512.

STATE MUSEUM

The State Museum of Natural History provides exhibits representing all stages of progress from all walks of life in North Carolina. Exhibits picturing the natural history of this State are of interest and educational value to all visitors. Annual increases in the number of visitors have been noted for a number of years.

FAIR REOPENED

The State Fair also provides for educational exhibits of all types of agricultural and industrial products of North Carolina. Because of travel restrictions, the Fair was not held during the War, but it is now an annual event, drawing large crowds and operating very successfully.

ACCOUNTING

To assure the successful operation of all these divisions from a financial standpoint, it is necessary that there be a coordination of accounting. The business records for all divisions are centralized in and handled through the Accounting office. By correlating its system with that of the Budget Bureau, efficiency and speed of handling items is obtained. In addition to the business records, the Accounting Division handles tags for fertilizer, feed, agricultural lime, and seed, and licenses for seed, oleomargarine and other like commodities subject to licensing by the Department of Agriculture.

PUBLIC KEPT INFORMED

Considering the multitude of services rendered by all Divisions of the Department of Agriculture, it is exceedingly important that the public be informed. This is the function of the Publications Division which is handling this task admirably. News service from the Department is furnished to more than 200 newspapers and 55 radio stations. In addition, information is supplied to farm and other magazines and many other organizations. Also the AGRICULTURAL REVIEW and other Departmental publications are handled through this office. The AGRICULTURAL REVIEW is mailed twice a month to 70,000 subscribers, the great majority of them being North Carolina farmers.

PERSONNEL

The Department of Agriculture employs a total of 301 people of which there are 70 who spend practically all of their time in

Reports Tremendous Progress

Tar Heel Agriculture Piles Up Good Record

BY W. KERR SCOTT
Former N. C. Commissioner of Agriculture.

RALEIGH—The past 10 years have seen North Carolina agriculture make tremendous advances. The State Department of Agriculture is justly proud of the part it has played in making this progress possible, and it is fitting at this time to review the achievements made during the department's present administration, which began 11 years ago.

At that time, we accepted the challenge to mold the Department of Agriculture into an agency ... ler serving the needs of ... ina farmers. ... how well ... met, ...

Removal Of Sales Tax On Farm Machinery And Fuel Is Urged

Raleigh, March 15 (AP)—The State 50 per cent through a 100-mesh screen, with a tolerance of five per cent in each instance.

Board of Agriculture today recommended removal of the sales tax from machinery and fuel used for agricultural purposes.

The board acted after hearing A. C. Edwards of Greene County, vice president of the State Farm Bureau Federation, report on recommendations adopted by the bureau at Asheville convention.

Acting on a Farm Bureau resolution, the board authorized its executive committee to work with the State Grange and other groups in seeking a solution to the problem of ... deficiencies. ...

Farmers Urged To Order Fertilizer Needs Early

MEDICATED FEEDS RULED OUT AGAIN

State Agriculture Department Gets Unanimous ...

Trapping Of Japanese Beetles Complete In N. C.

Trapping of Japanese beetles to determine the extent and ...

Production Of Grade A Milk On Increase In North Carolina

... April 12—North Carolina ... men sold 206,588,879 ... of Grade A milk to process... distributors ... the state ... as compared with sales ... 866,014 pounds the previous ... according to C. W. Pegram ... of the dairy division of the ... department of agriculture.

"The increase amounted to 19 ... per cent and was interpreted ... as indicating that a gro... fluid milk is ... year before.

"These figures," Pegram commented, "lead to several interesting conclusions. They show that milk consumption is increasing in North ... that our own dairy ...

Veterinary Division Seeks To Curb Poultry Diseases

Raleigh — In an effort to prevent the spread of poultry diseases, the Veterinary Division of the North Carolina Department of Agriculture is endeavoring to clean up poultry shipping facilities, it has been announced by Dr. L. M. Greene, a member of the division's professional staff.

More Pigs Needed To Meet Demands

Commissioner D. S. Coltrane Says Increase of 10 Per Cent Is Needed

RALEIGH — State Agriculture Commissioner D. S. Coltrane today called on North Carolina farmers to increase their fall pig production 10 per cent or more, in line with a program advocated by the U. S. Department of Agriculture.

Improved Storage Facilities Needed

Lack Of Adequate Drying and Storing Equipment Costing Farmers Large Sums

RALEIGH, June 7.—Lack of adequate facilities ... and storing corn and ... failure on the part of ... to observe certain principles in handling the ... resulting in heavy losses in one of North Caro... according to Dr. J. B. C... State Department of ...

Seed Lab Does Rushing Business

Faced with a deluge of requests for seed analyses, W. H. Darst, senior botanist in charge of the State ... Department of Agriculture's ... has appealed to ... dealers for coop... that he des... ergency ...

Get Soil Tested Before Liming

Crops differ a very ... the amount of lime ... soil. For ... azaleas, ca...

Sheep Growers Offered Aid In Obtaining Ewes

Raleigh—In an effort to encourage the lagging sheep industry in North Carolina the Markets Division of the State Department of Agriculture is ...

Coltrane Sworn In As Successor To W. Kerr Scott

RALEIGH, Feb. 14 ... D. S. Coltrane today took ... of office as commissioner of ... culture from ... V. Barnhardt ... in the ...

Grow More Cotton, Farmers Advised

North ... should ... plant th... they ... can c... opini... ture ...

Coltrane Urges More Feed, Forage

North Carolina needs to expand its livestock and poultry production, the opinion of Commissioner of ... ture D. S. Coltrane, but in... farmers should carefully ... feed and forage re... ching out into ... ake a ...

STATE REQUIRES IMPROVED FEEDS

Feed Makers Hesit... Dump Inferior ... in North ...

Fertilizer Checked For Full Weight

North Carolina farmers are ... ing full measure in all but a few ... of their fertilizer bags, according to ... D. Bausom, superintendent of ... the weights and measures division ... the State Department of Agri... culture. ... based this ... submitted by ... ing a sprin... weights. T... ing 2,2... ferti... diffe...

Poultry Industry Shows Rapid Growth

The lowly hen is the backbone of ... is rapidly growing industry in North Carolina, according to an Associated Press survey based on information furnished by the State Department of ... The AP story ... farms now are producing 75 ... of the eggs consumed in ... about 90 per cent of ... compared with 70 per ...

Cattle Marketing Plan Announced

At the request of many farmers and stock raisers, the North Carolina Department of Agriculture plans ... the marketing facilities ...

Inspectors Check Cattle Imports

In an effort to protect North ... livestock against Bang's ... ...

Warns Against Sale Of Illegal Tobacco-Curers

Raleigh, Jan. 19 — Reports that ... some dealers are offering for sale ... inadequate tobacco-curers that fail ... to meet State requirements have been received by C. D. Bausom, superintendent of the Weights and Measures Division of the ... Department of Agriculture. ... warned that regulations ... effective last September ... all types of ... are to be tested and ... Department ... forbid ...

New Bulletin On Snakes Aids Soldiers In State

The North Carolina State Museum has published a booklet entitled "Poisonous Snakes of the Eastern United States," in order to fill a great need and the many demands of soldiers who come to the museum to inquire about these reptiles which they encounter in their maneuvers.

The booklet, which was compiled by Harry T. Davis, director of the Museum, and C. S. Brimley, Entomology Division of Dept. of Ag..., the Massasauga, which is commonly called swamp rattler, black snapper, or prairie rattler, and which is found in the northerly region of the country from western New York State through to northeastern Kansas, and extending northeastward.

The booklet divides the eight poisonous snakes into two groups, the Cobra Group which include the Coral Snake, and the Pit Viper Group which included the 5 rattlesnakes and 2 moccasins. ...

News service from the Department is furnished to more than 200 newspapers and 55 radio stations.

the field making inspections and doing other regulatory work. In addition, it is necessary at different seasons to employ temporary help largely for inspection work. The peak of this temporary group usually reaches about 200 at rush seasons. During the four-year period covered by this report, there has been a considerable turnover of employees, a number returning from military service and many leaving to accept employment elsewhere. In many instances, the salary scale is not sufficient to attract suitable replacements for a number who have resigned. There is great need for adjustment in salaries in order that they will be comparable with those paid by other agencies.

It gives satisfaction, however, to know that our employees have built a good record of diligent service. Operating under adverse circumstances in many cases, every effort has been made to conduct the work in a creditable manner, and to provide service to the citizens of North Carolina according to the purpose of the Department of Agriculture.

COOPERATING AGENCIES

The Department of Agriculture acknowledges with grateful appreciation, the fine cooperation received in its program of work from all other agricultural agencies and from business and industrial interests of the State. The Agricultural Experiment Station and the Agricultural Extension Service of North Carolina State College both have an especial interest in our operations and have given the best of cooperation. The United States Department of Agriculture has had a very close tie-in with many phases of our program. Then there are the many other agricultural agencies serving the State, who have helped in many ways. Also farm organizations, the North Carolina Farm Bureau Federation, the Grange and all the others have given fine support. Much credit for the effectiveness of our program is due to the fine cooperation of business and industry.

ACCOUNTS

A. R. POWLEDGE

The financial report of the Department and the various divisions is as follows:

DEPARTMENT OF AGRICULTURE

Code 1101

STATEMENT OF DISBURSEMENTS

July 1, 1944-June 30, 1948

A. R. POWLEDGE

I. ADMINISTRATION

	1947-48	1946-47	1945-46	1944-45
Board of Commissioners	$ 1,036.28	$ 2,211.97	$ 2,054.95	$ 724.81
Salary—Commissioner	6,600.00	6,600.00	6,600.00	6,600.00
Salaries and Wages	10,770.97	11,524.30	11,898.00	10,148.09
Supplies and Materials	320.31	323.85	238.53	297.49
Postage, Telephone, Telegraph & Express	1,274.70	1,319.71	1,232.07	1,136.78
Travel Expense	2,495.29	2,298.36	2,167.96	1,760.68
Printing and Binding	327.42	136.90	94.35	1,227.19
Repairs and Alterations	9.00	4.31	6.35	28.35
General Expense	173.77	375.00	199.10	197.30
Equipment	635.74	109.81	91.61	33.00
Legislative Representative in Washington, D. C.	499.92	499.92	499.92	500.00
TOTAL	$ 24,143.40	$ 25,404.13	$ 25,082.84	$ 22,653.60

ACCOUNTING OFFICE

Salaries and Wages	$ 10,610.83	$ 8,904.76	$ 9,608.71	$ 7,044.52
Supplies and Materials	247.65	223.27	104.13	162.42
Printing and Binding	247.16	181.68	178.14	205.37
Repairs and Alterations	129.55	104.41	74.10	72.70
Equipment	657.16	407.61	105.57	47.75
TOTAL	$ 11,892.35	$ 9,821.73	$ 10,070.65	$ 7,532.76

PUBLICITY AND PUBLICATIONS

Salaries and Wages	$ 10,913.13	$ 9,335.20	$ 7,111.47	$ 6,153.65
Supplies and Materials	428.71	346.57	332.73	339.86
Postage Permit "Agricultural Review"	1,250.00	1,178.25	1,035.00	1,200.00
Travel Expense	283.52	600.00	552.73	168.00
Printing "Agricultural Review"	15,549.92	10,401.01	11,837.14	7,923.67
Repairs and Alterations	36.00	29.35	45.67	19.31
Equipment	118.53	.....	46.59	118.08
TOTAL	$ 28,579.81	$ 21,890.38	$ 20,961.33	$ 15,922.57

TOTAL ADMINISTRATION	$ 64,615.56	$ 57,116.24	$ 56,114.82	$ 46,108.93

	1947-48	1946-47	1945-46	1944-45
II. INSPECTION				
Salaries and Wages	$ 22,593.76	$ 16,498.63	$ 16,167.99	$ 14,275.00
Salaries and Wages, Extra	10,746.25	8,046.35	5,769.76	5,413.30
Supplies and Materials	1,124.39	638.39	610.63	439.35
Postage, Telephone, Telegraph and Express	2,166.26	1,750.00	1,886.36	1,518.54
Travel Expense	23,258.44	21,464.81	17,104.34	18,532.68
TOTAL	$ 59,889.10	$ 48,398.18	$ 41,539.08	$ 40,178.87
III. MARKETS				
Salaries and Wages	$ 88,514.02	$ 61,344.11	$ 51,076.00	$ 41,427.43
Salaries and Wages, Extra	2,950.64	2,067.84	9,723.60	12,280.02
Supplies and Materials	1,319.39	1,355.64	802.92	846.72
Postage, Telephone, Telegraph and Express	4,174.14	2,891.47	2,660.11	1,869.06
Travel Expense	22,872.00	16,133.33	15,031.87	15,856.48
Printing and Binding	133.53	65.30	339.85	421.92
Repairs and Alterations	187.93	59.19	42.60	50.90
Market News Letter	826.00	907.93	910.02	1,030.76
Subscriptions	242.50	230.75	303.00	141.50
General Expense	43.55	.....	113.78	122.21
Equipment	1,390.65	504.80	1,268.92	196.20
Leased Wire	.....	106.48	424.54	722.70
Reimbursement USDA	3,000.00	3,000.00	.....	.....
TOTAL	$125,654.35	$ 88,666.84	$ 82,697.21	$ 74,965.90
Transferred from General Fund	25,000.00	22,110.27	20,674.30	17,770.39
	$100,654.35	$ 66,556.57	$ 62,022.91	$ 57,195.51
IV. CREDIT UNION				
Transfer to General Fund	$ 2,500.00	$ 2,500.00	$ 2,500.00	$ 2,500.00
V. DAIRY				
Salaries and Wages	$ 28,817.47	$ 19,086.87	$ 15,793.37	$ 7,664.62
Supplies and Materials	944.11	1,498.26	331.34	203.35
Postage, Telephone, Telegraph and Express	343.61	246.18	210.23	146.76
Travel Expense	7,191.50	4,810.92	3,962.53	2,569.25
Printing and Binding	653.00	261.57	41.69	32.24
Repairs and Alterations	35.83	.....	.....	.....
General Expense	14.34	.....	.....	.....
Equipment	338.33	299.63	242.26	40.80
Dairy Products Laboratory	.....	9,767.89	.....	.....
TOTAL	$ 38,338.19	$ 35,971.32	$ 20,581.42	$ 10,657.02
VI. ENTOMOLOGY				
Salaries and Wages	$ 15,336.61	$ 12,749.64	$ 14,520.00	$ 14,608.30
Supplies and Materials	285.00	330.41	152.00	92.15
Postage, Telephone, Telegraph and Express	229.01	195.40	162.75	169.09
Travel Expense	3,943.44	3,692.54	3,401.03	4,584.34
Printing and Binding	320.42	134.36	193.53	171.89
Subscriptions and Dues	91.30	59.71	39.30	82.25
Equipment	.....	.....	75.00	.....
TOTAL	$ 20,205.78	$ 17,162.06	$ 18,543.61	$ 19,708.02

	1947-48	1946-47	1945-46	1944-45
VII. SEED LABORATORY				
Salaries and Wages	$ 22,103.88	$ 15,892.61	$ 15,511.22	$ 13,355.36
Supplies and Materials	669.68	454.50	372.35	335.81
Postage, Telephone, Telegraph and Express	685.50	623.04	541.94	527.30
Travel Expense	339.14	761.12	285.84	386.40
Printing and Binding	544.26	534.31	708.21	535.36
Repairs and Alterations	87.17	179.57	34.11	49.66
Equipment	356.99	1,166.34	956.16	849.83
Attorney's Fee or General Expense	.....	.....	393.56	150.00
TOTAL	$ 24,786.62	$ 19,611.49	$ 18,803.39	$ 16,189.72
VIII. ANALYTICAL				
Salaries and Wages	$ 91,109.41	$ 68,305.28	$ 59,648.81	$ 54,082.22
Supplies and Materials	4,384.99	5,300.79	4,169.38	4,159.25
Postage, Telephone, Telegraph and Express	1,271.23	1,075.00	1,153.60	905.68
Travel Expense	9,792.27	7,549.52	5,983.88	6,307.86
Printing and Binding	7,211.05	5,430.56	4,355.98	3,140.58
Repairs and Alterations	679.98	220.64	167.92	199.12
Laundry	22.30	.....	2.56	3.54
Equipment	1,195.73	333.38	545.51	81.76
General Expense	279.20	35.50	227.00	50.00
Renovation and Replacement Laboratory	1,589.29	.....	.....	.....
New Equipment and Vitamin Laboratory	.....	.....	.....	.....
Build and Equip Dairy Products Control Laboratory	.....	.....	6,700.40	.....
Analyzing Fertilizer Samples	.....	.....	1,479.00	.....
TOTAL	$117,535.45	$ 88,250.67	$ 84,434.04	$ 68,930.01
IX. CROP STATISTICS				
Salaries and Wages	$ 30,895.92	$ 23,549.33	$ 23,639.01	$ 18,923.28
Salaries and Wages, Extra	4,148.96	3,210.19	2,046.19	2,353.44
Supplies and Materials	4,224.86	2,205.02	760.85	117.85
Postage, Telephone, Telegraph and Express	232.11	321.69	245.52	263.84
Travel Expense	941.23	1,295.44	1,558.40	908.50
Printing and Binding	773.94	1,028.00	4,931.09	2,104.83
Repairs and Alterations	337.81	433.03	238.08	199.26
Subscriptions and Dues	25.00	18.10	17.25	13.50
Equipment	3,190.42	2,110.06	1,800.12	1,589.27
Emergency War Work	.....	.....	.....	140.98
TOTAL	$ 44,770.25	$ 34,170.86	$ 35,236.51	$ 26,614.75
X. SOIL TESTING				
Salaries and Wages	$ 27,195.84	$ 17,295.62	$ 16,221.12	$ 12,162.82
Supplies and Materials	4,797.02	2,432.69	1,593.01	2,485.79
Postage, Telephone, Telegraph and Express	1,049.28	694.49	489.56	344.23
Travel Expense	1,964.81	2,080.73	1,249.84	1,309.74
Printing and Binding	86.34	383.52	591.02	98.16
Equipment	1,163.71	713.10	734.46	379.24
General Expense	214.59	.....	.....	.....
TOTAL	$ 36,471.59	$ 23,600.15	$ 20,879.01	$ 16,779.98

	1947-48	1946-47	1945-46	1944-45
XI. BLISTER RUST CONTROL				
Salaries and Wages	$ 2,797.60	$ 4,981.46	$ 4,743.66	$ 2,004.75
Supplies and Materials	.....	.....	.....	.....
TOTAL	$ 2,797.60	$ 4,981.46	$ 4,743.66	$ 2,004.75
XII. VETERINARY				
Salaries and Wages	$ 78,066.11	$ 60,281.27	$ 45,330.29	$ 31,622.70
Supplies and Materials	943.07	327.36	317.45	441.90
Postage, Telephone, Telegraph and Express	926.64	1,072.96	935.73	613.63
Travel Expense	32,001.12	29,175.20	19,852.03	12,394.06
Printing and Binding	799.82	548.50	710.24	253.63
Repairs and Alterations	26.99	7.30	25.20	.....
General Expense	187.39	50.34	63.00	103.57
Equipment	362.68	406.48	418.82	114.86
Clinic on Mastitis	.....	.....	.....	.....
Diagnostic Laboratory	2,801.60	.....	.....	.....
TOTAL	$116,115.42	$ 91,869.41	$ 67,652.76	$ 45,544.35
XIII. TEST FARMS ADMINISTRATION				
Salaries and Wages	$ 7,195.00	$ 5,340.00	$ 5,399.42	$ 5,100.00
Supplies and Materials	58.05	117.84	143.73	74.91
Postage, Telephone, Telegraph and Express	335.70	290.61	246.46	277.06
Travel Expense	1,009.98	922.25	633.20	806.91
Printing and Binding	74.34	67.65	50.64	25.00
General Expense	45.14	40.63	36.00	9.77
Insurance and Bonding	1,253.98	253.53	1,317.70	674.00
Purchase of Automotive Equipment	.....	26.00	1,072.80	.....
TOTAL	$ 9,972.19	$ 7,058.51	$ 8,899.95	$ 6,967.65
TIDEWATER TEST FARM				
Salaries and Wages	$ 15,364.95	$ 10,720.65	$ 10,822.41	$ 7,851.03
Supplies and Materials	5,413.88	4,579.52	2,192.01	1,783.09
Postage, Telephone, Telegraph and Express	196.58	96.86	164.53	74.56
Travel Expense	198.52	137.54	315.16	239.06
Motor Vehicle Operation	1,064.53	1,676.23	1,391.25	692.03
Repairs and Alterations	1,441.95	384.68	17.74	163.12
General Expense	573.00	439.57	678.70	283.09
Light, Power and Water	203.58	38.64	19.53	.....
Equipment	2,085.72	1,477.69	775.45	1,433.23
Additions and Betterments	6,024.00	15,950.11	27,691.42	13,883.37
TOTAL	$ 32,566.71	$ 35,501.49	$ 44,068.20	$ 26,402.58
TOBACCO TEST FARM				
Salaries and Wages	$ 27,607.70	$ 24,689.29	$ 19,615.74	$ 14,762.32
Supplies and Materials	4,889.35	3,993.58	3,589.17	2,775.31
Postage, Telephone, Telegraph and Express	271.36	389.93	299.40	170.88
Travel Expense	70.24	145.36	201.78	34.24
Printing and Binding	.....	5.75	3.75	18.35
Motor Vehicle Operation	651.21	243.31	149.16	58.08
Light, Power and Water	322.79	168.02	133.36	115.62
Repairs and Alterations	2,552.41	491.90	780.33	465.42
General Expense	393.00	90.50	65.00	257.75
Equipment	1,668.29	434.34	1,843.72	905.50

	1947-48	1946-47	1945-46	1944-45
Additions and Betterments	3,113.07	1,050.57	1,268.63	639.65
Tobacco Laboratory	36,385.45	.....	.....	.....
Tobacco Program—Oxford	.....	1,170.00	.....	.....
Tobacco Program—Raleigh	.....	2,499.46	1,426.36	.....
TOTAL	$ 77,924.87	$ 35,372.01	$ 29,376.40	$ 20,203.12

UPPER COASTAL PLAIN TEST FARM

Salaries and Wages	$ 24,799.52	$ 17,936.89	$ 17,448.48	$ 12,451.55
Supplies and Materials	7,485.06	3,847.65	3,117.17	3,631.15
Postage, Telephone, Telegraph and Express	306.84	219.71	197.57	216.83
Travel Expense	498.83	475.00	396.30	299.05
Motor Vehicle Operation	1,573.50	1,108.16	1,145.52	981.98
Light, Power and Water	656.90	540.15	427.42	381.50
Repairs and Alterations	2,129.58	1,373.37	488.67	389.66
General Expense	50.00	101.77	6.00	11.25
Equipment	1,506.79	736.03	1,814.32	473.45
Additions and Betterments	10,047.29	138.67	11.80	.....
Tobacco Program	.....	478.90	.....	.....
TOTAL	$ 49,054.11	$ 26,956.30	$ 25,053.25	$ 18,836.42

MOUNTAIN TEST FARM

Salaries and Wages	$ 20,288.41	$ 15,755.88	$ 20,576.76	$ 12,631.90
Supplies and Materials	16,530.99	8,344.25	8,486.74	5,783.46
Postage, Telephone, Telegraph and Express	622.72	297.31	472.53	399.99
Travel Expense	1,097.15	695.61	1,794.61	1,744.81
Printing and Binding	4.10	33 60	62.25	70.73
Motor Vehicle Operation	719.71	527.37	1,612.08	1,585.99
Light, Power and Water	1,131.42	832.72	926.09	483.37
Repairs and Alterations	562.89	148.76	603.70	231.84
General Expense	1,452.20	1,111.65	1,755.57	4,084.84
Equipment	1,516.56	.....	615.83	250.96
Additions and Betterments	1,449.33	.....	22.25	126,890.00
Tobacco Program	.....	3,783.02	6,099.79	1,000.00
TOTAL	$ 45,375.48	$ 31,530.17	$ 43,028.20	$155,157.89

UPPER MOUNTAIN TEST FARM

Salaries and Wages	$ 11,558.37	$ 9,184.01
Supplies and Materials	8,003.52	4,629.76
Postage, Telephone, Telegraph and Express	250.00	129.83
Travel Expense	750.00	750.00
Printing and Binding	3.30	34.47
Motor Vehicle Operation	998.13	1,100.00
Light, Power and Water	337.52	255.00
Repairs and Alterations	219.28	.....
General Expense	315.85	333.50
Equipment	5,144.40	.....
Additions and Betterments	4,573.46	.....
Tobacco Program	.....	1,849.66
TOTAL	$ 32,153.83	$ 18,266.23

	1947-48	1946-47	1945-46	1944-45
COASTAL PLAIN TEST FARM				
Salaries and Wages	$ 28,747.83	$ 25,717.02	$ 24,742.20	$ 17,856.61
Supplies and Materials	18,990.20	8,733.00	6,961.90	8,102.38
Postage, Telephone, Telegraph and Express	474.30	439.30	333.97	422.65
Travel Expense	49.56	.....	11.58	.....
Printing and Binding	64.66	30.92	.....	27.27
Motor Vehicle Operation	1,745.23	2,021.09	1,652.24	1,898.20
Light, Power and Water	1,162.69	900.00	784.06	796.26
Repairs and Alterations	2,038.20	365.81	600.57	1,148.78
General Expense	348.10	264.99	246.38	218.17
Equipment	3,439.79	855.23	1,650.45	1,700.30
Additions and Betterments	2,175.25	15,726.95	863.31	.....
Poultry Project	19,997.55	.....	.....	.....
Dairy Project	.....	329.67	2,767.36	.....
Purchase of Incubator	.....	1,134.00	.....	.....
TOTAL	$ 79,233.36	$ 56,517.98	$ 40,614.02	$ 32,170.62
PIEDMONT TEST FARM				
Salaries and Wages	$ 16,020.18	$ 12,592.27	$ 11,590.14	$ 10,135.10
Supplies and Materials	2,648.71	2,195.02	2,088.04	1,839.16
Postage, Telephone, Telegraph and Express	124.79	88.90	134.44	151.22
Travel Expense	524.64	490.71	487.12	350.76
Printing and Binding	48.14	8.00	4.20	9.02
Motor Vehicle Operation	599.75	395.63	587.83	354.55
Light, Power and Water	191.73	188.92	184.17	196.16
Repairs and Alterations	1,195.27	698.18	484.48	419.31
General Expense	79.84	79.60	47.13	40.38
Equipment	651.80	1,619.94	222.08	.....
Additions and Betterments	982.75	.....	.....	.....
TOTAL	$ 23,067.60	$ 18,357.17	$ 15,829.63	$ 13,496.11
TOTAL TEST FARMS	$349,348.15	$229,559.86	$206,869.65	$273,234.39
XV. MISCELLANEOUS				
Salaries and Wages	$ 4,855.97	$ 3,568.10	$ 2,917.05	$ 1,980.00
Custodial	6,480.00	6,480.00	6,480.00	6,480.00
Farmers' Convention	300.00	300.00	.....	.....
Contribution to Retirement System	26,661.56	17,437.03	16,412.79	11,909.95
Tax Tags and Stamps	22,474.56	17,340.26	18,242.72	15,369.93
Serum to be resold	11,169.84	9,372.66	14,242.91	15,487.54
Workmen's Compensation	42.00	.....	.....	64.50
Insurance and Bonding	579.67	618.23	228.89	.....
Motor Vehicle Operation	790.05	575.04	567.49	700.96
Attorney's Fees	.....	.....	300.00	.....
State Fair Exhibit	865.79	718.53	.....	.....
Purchase of Automobile	1,318.11	3,896.06	.....	139.05
Lighting Agricultural Building	748.63	7,712.56	.....	.....
"A History of Agriculture"	1,692.50	.....	.....	.....
"Favorite Recipes of N. C."	.....	6,991.46	43.91	7,766.88
Sheep Distribution Project	.....	.....	.....	7,500.00
TOTAL	$ 77,978.68	$ 75,009.93	$ 59,435.76	$ 67,398.81
XVI. RABIES				
Rabies	$ 734.26	$ 489.50	$ 227.55	$ 653.04

	1947-48	1946-47	1945-46	1944-45
XVII. JAPANESE BEETLE				
Salaries and Wages	$ 2,340.85	$ 1,761.00	$ 408.00	$ 1,736.20
Wages Trap-Tenders	2,040.05	1,583.40	1,054.10	2,305.35
Supplies and Materials	5,295.51	2,066.96	1,861.47	943.10
Travel Expense	.....	24.50	71.55	95.25
TOTAL	$ 9,676.41	$ 5,435.86	$ 3,395.12	$ 5,079.90
XVIII. EMERGENCY SALARY				
Emergency Salary	.....	$ 23,200.27	$ 20,807.45	.....
Emergency Bonus	.....	44,183.49	.....	.....
Employees' War Bonus	.....	.....	.....	32,304.31
TOBACCO ADVISORY COUNCIL				
Salary—Executive Secretary	.....	$ 4,500.00	200.00	.....
Supplies and Materials	.....	94.86	49.05	.....
Postage, Telephone, Telegraph and Express	.....	33.65	.....	.....
Travel Expense	.....	803.58	50.60	.....
General Expense	.....	14.95	.....	.....
TOTAL	.....	$ 5,447.04	$ 299.65	.....
Accrued Interest on Bonds	.....	.....	4,838.45	.....
TOTAL EXPENDITURES	$1,091,417.41	$895,624.63	$749,599.14	$748,852.75
Refund from General Fund	64,000.00	22,110.27	20,674.30	17,770.39
TOTAL	$1,027,417.41	$873,514.36	$728,924.84	$731,082.36
Treasurer's Cash of as June 30	186,794.82	321,331.40	283,937.08	792,904.85
Investment in Bonds— Premiums on Bonds	618,843.75	618,843.75	618,843.75	.....
Total Credit Balance as of June 30	$ 805,638.57	$940,175.15	$902,780.83	$792,904.85

DEPARTMENT OF AGRICULTURE

Code 1101

STATEMENT OF RECEIPTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Fertilizer Tax	$401,605.35	$416,954 88	$386,195.12	$366,570.14
Cottonseed Meal	13,120.51	17,217.50	17,434.27	28,175.81
Feed	182,815.57	209,556.40	209,860.76	209,216.13
Seed License	25,872.00	26,038.00	28,123.00	24,474.09
Condimental Feed	2,390.00	2,530.00	2,680.00	1,900.00
Serum	7,195.26	6,183.05	11,236.95	13,648.58
Costs	25,408.08	31,563.74	19,399.85	13,894.42
Linseed Oil	1,127.00	1,075 53	932.50	1,083.25
Bleached Flour	9,960.00	8,461.00	9,277.50	11,025.00
Bottling Plants	2,000.00	2,120.00	1,910.00	1,710.00
Ice Cream	2,240.00	1,420.00	2,110.00	1,085.00
Insecticides	12,140.00	5,271.00	4,120.00	3,170.00
Test Farms	95,849.73	89,312.28	78,822.08	71,574.81
Bakeries	2,480.00	2,580.00	1,670.00	1,430.00
Chicken Tests	15,563.07	11,519.78	7,180.05	3.541.36
Seed Tags	13,974.43	7,337.12	7,517.33	6,363.41
Inspection Entomology	2,447.02	2,503.05	2,165.20	2,030.48
Oleomargarine	3,375.00	3,375.00	3,525.00	3,525.00
Rabies	570.00	999.00	558.59	579.22
Land Plaster Tags	1,345.00	1,190.00	3,463.52	2,302.03
Agricultural Lime Stamps	15,972.50	25,707.94	11,746.25	5,888.50
Fertilizer Registrations	6,693.00	2,988.00	3,021.00	3,428.80
Miscellaneous	697.20	967.21	1,635.13	982.94
Feed Registrations	4,174.00	3,747.00	3,400.00	3.293.00
Canned Dog Food Registrations	648.00	666.00	685.00	707.00
Lime Registrations	180.00	360.00	160.00	165.00
Land Plaster Registrations	102.50	35.00	50.00	60.00
Livestock Market Permits	925.00	1,175.00	1,100.00	925.00
Hatchery Fees and Supplies	6,198.52	7,168.96	7,847.75	10,035.22
Low Grade Fertilizer Tags	339.54	987.31	1,834.57	.....
"Favorite Recipes of N. C."	656.80	1,659.11	1,012.61	7,600.35
Sale of Automotive Equipment	1,163.62	2,253.50	.....	.....
Dog Food Stamps	3,629.63	986.32	12.00	(1.32)
"Insects of N. C."	22.50	.....	.....	.....
Sale of Wenona Farm	.....	.....	.....	20,000.00
Accrued Interest on Bonds	15,000.00	15,000.00	8,114.79	.....
USDA Developing Marketing	15,000.00	15,000.00	.....	.....
TOTAL	$892,880.83	$910,908.68	$838,800.82	$820,383.22

LAND PURCHASES AND DEVELOPMENTS

Special Fund—Code 21

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
UPPER MOUNTAIN STATION				
Cattle and Workstock Barn	Account		$ 4,036.46	$ 8,464.44
Sheep Barn	Closed		301.07	1,898.93
Dairy Barn	Out		.....	.....
Supplies and Materials (Fencing)			885.29	331.39
General Expense			37.40	817.35
Livestock		910.95	1,239.93	574.12
Tobacco Barn and Ordering Room			2,071.53	2,799.86
Repairs and Alterations (2 tenant houses)			3,344.74	4,069.11
Water System			8.95	489.16
Moving and Improving Cattle Barns			.....	799.90
Repairs and Alterations (Barns)			2,750.00	220.30
4-H Club Fund Reserve			6,050.00	.....
Land Purchases			.....	45,000.00
Repairs to Superintendent's Home and Herdsman's New Home			10,067.36	935.49
Farm Equipment		2,670.02	2,078.89	1,413.15
Office, Garage and Grading shed			6,523.91	.....
Cleaning up pasture, straightening creek, etc., (General Expense)			.....	.....
Additions and Betterments		3,537.00	.....	.....
TOTAL UPPER MOUNTAIN		$ 7,117.97	$ 39,394.63	$ 67,813.20
EXPERIMENT STATION				
Poultry Plant			$ 2,619.61	$ 12,220.39
Dairy Building and Facilities			6,174.62	15,937.64
Office and Laboratory Building			9,177.91	328.00
Superintendent's Dwelling			139.08	60.00
Water and Sewage System			5.14	994.86
New Tenant House			5,745.21	8,807.62
Orchard, Landscaping and Fencing		1,474.00	2,222.98	503.03
Farm Implements and Equipment		550.00	1,428.36	1,737.91
Repairs to old building		999.00	1,323.03	982.90
Tobacco Barn		.....	710.54	1,962.94
Implement Shed and Shop		.....	2,500.00	.....
Additions and Betterments		2,639.23	.....	.....
Livestock		970.00	.....	.....
TOTAL MOUNTAIN EXPERIMENT STATION		$ 6,632.23	$ 32,046.48	$ 43,535.29
TOTAL EXPENDITURES		$ 13,750.20	$ 71,441.11	$111,348.49

LAND PURCHASES AND DEVELOPMENT

STATEMENT OF RECEIPTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Transfer of funds from Code 1101	Account			$126,890.00
Balance July 1, 1945	Closed		$ 85,191.31	
Balance July 1, 1946	Out		$ 13,750.20	
Balance July 1, 1947			.00	

SHEEP DISTRIBUTION PROJECT

Special Fund—Code 3

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Sheep Ewes Purchased	$ 6,087.50	$ 711.00	$ 3,330.00	$ 4,500.00
Purchase of Purebred Cattle in Cooperation with State College	.....	6,300.37	2,354.00	44,203.13
Purchase of Cattle	3,885.85	7,995.57	9,318.15	10,401.32
Purchase of Lambs	.....	.....	25.00	.....
Purchase of Rams	40.00	.....	251.00	291.00
Freight & Trucking	.....	40.00	633.85	1,204.82
Feed and Pasturage	.....	.....	295.25	199.03
General Expense	57.70	14.14	34.45	10.50
Storage of Eggs for Public Schools	.....	.....	.....	7,856.35
Spray Equipment	.....	27,344.00	.....	.....
Handling and Storage of Food Products	126.03	1,411.66	.....	.....
Displays for N. C. State Fair	686.72	.....	.....	.....
TOTAL	$ 10,883.80	$ 43,816.74	$ 16,241.70	$ 68,666.15

SHEEP DISTRIBUTION PROJECT

STATEMENT OF RECEIPTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Sale of Ewes	$ 6,851.00	$	$ 3,346.65	$ 5,406.51
Sale of Cattle	3,885.85	7,996.07	9,370.65	10,488.84
Sale of Lambs	.....	.....	25.00	2,278.20
Sale of Purebred Heifers	.....	.....	.....	5,951.68
Reimbursement for purchase of purebred cattle	.....	6,324.62	2,354.00	38,263.14
Sale of Rams	45.00	.....	322.50	335.00
Miscellaneous Collections	21.35	39.51	.....	80.91
Storage of Eggs	.....	.....	2.40	8,654.74
Receipt of Spray Equipment	.....	1,150.00	26,194.00	.....
Handling and Storage of Food Products	3,478.00	618.40	.....	.....
State Fair Dairy Project	700.00	.....	.....	.....
Transfer from Department of Agriculture	.....	.....	.....	7,500.00
TOTAL	$ 14,981.20	$ 16,128.60	$ 41,615.20	$ 78,959.02

Balance July 1, 1945	$19,978.71
Balance July 1, 1946	$45,352.21
Balance July 1, 1947	$17,664.07
Balance July 1, 1948	$21,761.47

STATE WAREHOUSE SYSTEM

Special Fund—Code 1801

FINANCIAL STATEMENT

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Salary—Superintendent	$ 4,999.92	$ 4,320.00	$ 4,230.00	$ 3,900.00
Salaries and Wages—Staff	14,794.50	14,919.72	14,980.88	13,063.96
Supplies and Materials	103.36	114.88	87.32	100.07
Postage, Telephone, Telegraph and Express	753.21	769.92	1,052.80	858.44
Travel Expense	1,167.59	1,197.76	1,038.95	2,519.35
Printing and Binding	7,648.10	8,389.41	10,229.95	6,124.61
Motor Vehicle Operation	.....	.....	.....	.....
Repairs and Alterations	22.70	4.50	30.80	42.43
General Expense	115.50	141.14	134.00	90.00
Insurance and Bonding	301.67	384.31	382.75	26.00
Equipment	.....	120.20	51.33	268.75
Contribution to Retirement System	931.36	660.27	705.08	586.07
Emergency Salary	.....	611.06	665.99	.....
Repairs to Warehouse Building—Norlina	.....	332.20	.....	.....
Emergency Bonus	.....	1,427.47	.....	.....
Employees' War Bonus	.....	.....	.....	1,764.53
TOTAL	$ 30,837.91	$ 33,392.84	$ 33,589.85	$ 29,344.21

STATE WAREHOUSE SYSTEM

STATEMENT OF RECEIPTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Interest on Bonds	$ 13,750.00	$ 12,906.25	$ 12,237.05	$ 21,036.89
Interest on Loans	4,182.54	11,660.69	10,913.43	11,697.92
Leases	204.00	208.00	240.00	244.00
Sale of Warehouse Supplies	10,394.70	6,790.58	13,232.47	5,759.33
Sale of Loose Cotton	161.25	349.11	.....	.....
Miscellaneous	4.33	.....	.....	.....
State Auditor's Warrants Outstanding	.....	.....	.....	173.30
TOTAL	$ 28,696.82	$ 31,914.63	$ 36,622.95	$ 38,911.44
Treasurer's Cash, Supervision Account	$ 63,221.74	$ 64,925.60	$ 66,735.32	$ 61,093.03
Treasurer's Cash, Principal Fund	$ 42,306.07	$ 67,656.07	$ 82,059.98	$ 78,871.07

Total Investments and Loans at June 30, 1948.....$689,650.00

COOPERATIVE INSPECTION SERVICE

Special Fund—Code 1803

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Salaries, U. S. Inspectors and Supervisors	$ 72,689.15	$ 55,017.89	$ 59,249.40	$ 52,757.64
Supplies and Materials	275.85	385.11	223.43	178.05
Postage, Telephone, Telegraph and Express	1,227.75	1,247.57	842.26	999.89
Travel Expense	26,520.70	36,583.71	18,555.77	25,606.57
Printing and Binding	10.95	392.83	77.40	.....
Typing	445.65	1,102.20	682.10	845.65
Office Rent	252.25	185.00	128.50	127.50
General Expense	43.05	64.35	17.00	28.50
USDA Certificates	2,752.94	3,725.29	2,872.92	1,190.87
Equipment	49.40	569.21	186.03	135.84
Contribution to Retirement System	137.28	83.60	75.27	170.83
Emergency Salary	.....	119.68	125.00	.....
Emergency Bonus	.....	245.01	.....	.....
Employees' War Bonus	.....	.....	.....	667.26
Sweet Potatoes Purchased for resale	.....	.....	.....	11,622.25
TOTAL	$104,404.97	$ 99,721.45	$ 83,035.08	$ 94,330.85

COOPERATIVE INSPECTION SERVICE

STATEMENT OF RECEIPTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Strawberries	$ 3,915.10	$ 2,175.51	$ 2,264.57	$ 1,933.39
Potatoes, Cucumbers, Beans	57,115.40	57,945.73	49,315.93	46,191.54
Mixed Vegetables	18,464.78	11,720.66	11,796.95	6,263.41
Field Peas	.....	.....	14.92	.....
Tomatoes	10.65	.....	7.32	26.85
Cabbage	1,533.81	2,617.57	2,397.59	1,299.21
Corn	20.77	1.25	68.37	154.71
Cantaloupes	196.90	337.98	430.33	845.86
Peaches	3,878.42	4,910.24	4,977.43	4,427.68
Watermelons	1,548.15	2,832.99	1,215.00	2,140.78
Apples	656.21	620.82	102.37	724.72
Sweet Potatoes	2,729.31	36.40	445.82	754.05
State Inspections—Various	.....	.....	.....	.....
Miscellaneous	318.75	209.02	146.35	536.45
Soybeans	.....	87.76	44.25	36.75
Interest on Bonds	1,310.00	1,320.00	820.00	820.00
Egg Inspections	10,391.70	9,364.89	26,746.78	13,128.27
Peanut Inspections	7,387.54	2,126.50	1,450.00	2,958.50
Wheat Inspections	.....	.....	.75	13.00
Sweet Potatoes purchased for resale	.....	.....	.....	11,875.63
TOTAL	$109,477.49	$ 96,307.32	$102,244.73	$ 94,130.80

Balance July 1, 1945 ..... $35,407.87
Balance July 1, 1946 ..... $56,141.89
Balance July 1, 1947 ..... $ 3,087.91
Balance July 1, 1948 ..... $10,160.43
Investment in Highway and U. S. Treasury Bonds June 30, 1948 ..... $45,000.00

N. C. STATE FAIR

Special Fund—Code 20

FINANCIAL STATEMENT

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Salaries and Wages	$ 44,422.78	$ 40,296.38	$ 4,610.00	$ 2,580.00
Supplies and Materials	3,209.51	1,386.45	31.24	.....
Postage, Telephone, Telegraph and Express	1,488.69	1,190.00	99.80	19.94
Travel Expense	7.44	120.30	.....	.....
Printing and Binding	5,763.16	3,515.58	74.84	.....
Motor Vehicle Operation	805.62	455.88	288.16	268.52
Light, Power and Water	924.77	1,314.56	132.67	143.72
Repairs and Alterations	15,082.72	14,575.89	3,307.49	21.37
General Expense	54,811.30	48,349.62	.....	54.96
Equipment	522.00	2,206.31	4.50	.....
Insurance and Bonding	1,368.34	152.86	2,907.50	.....
Contribution to Retirement System	426.84	267.48	159.58	.....
Emergency Salary	.....	360.00	230.00	.....
Water Line to Fairgrounds	22,382.01	.....	.....	.....
Engineering Fees	2,740.00	.....	.....	.....
Emergency Bonus	.....	666.00	.....	.....
Accrued Interest on Bonds	.....	824.80	.....	.....
Employees' War Bonus	.....	.....	.....	180.00
TOTAL	$153,955.18	$115,682.11	$ 11,845.78	$ 3,268.51

N. C. STATE FAIR

STATEMENT OF RECEIPTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
General Admission	$ 57,722.83	$ 78,910.15	.....	.....
Grandstand Admissions	26,994.40	37,218.51	.....	.....
Auto Parking	6,938.50	10,523.00	.....	.....
Carnival Privileges	26,205.20	36,102.67		
Sale of Advertising	3,822.50	3,487.50	.....	.....
Sale of Exhibit Space	7,606.25	4,533.50	.....	.....
Rent of Eating Booths	6,973.25	4,759.50	286.00	.....
Concession and Privileges	12,174.00	13,122.59	122.50	.....
Entry Fees	651.75	356.00	.....	.....
Miscellaneous	1,242.73	1,734.94	188.16	(139.56)
Rental on Buildings	.....	203.00	165.00	60.00
Interest on Bonds	2,260.00	2,645.00	1,280.25	963.75
Storage on Tobacco	.....	1,219.35	5,631.14	3,767.66
Rental of Fairgrounds	400.00	.....	.....	.....
TOTAL	$109,477.49	$ 96,307.32	$ 7,673.05	$ 4,651.85
Balance July 1, Invested State Bonds		$ 22,000.00	$ 24,816.99	$ 24,816.99
Balance July 1, Invested in U. S. Treasury Certificates of Indebtedness	$ 75,000.00	$ 75,000.00		$ 30,000.00
Treasurer's Cash	$ 56,432.72	$ 35,396.49	$ 33,114.45	$ 7,287.18
TOTAL	$131,432.72	$132,396.49	$ 57,931.44	$ 62,104.17

WEIGHTS AND MEASURES

General Fund—Code 321

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Salary—Superintendent	$ 4,500.00	$ 3,900.00	$ 3,900.00	$ 3,300.00
Salaries—Staff	24,176.04	17,740,41	14,903.56	12,384.77
Salaries and Wages, Temporary	225.00	.....	522.45	.....
Supplies and Materials	1,525.18	371.58	228.29	93.89
Postage, Telephone, Telegraph and Express	383.22	261.88	287.92	216.05
Travel Expense	14,099.90	14,824.47	12,561.10	11,172.55
Printing and Binding	308.15	141.28	184.34	96.81
Motor Vehicle Operation	886.47	994.22	634.73	392.80
Repairs and Alterations	157.26	1,274.55	19.38	59.46
Equipment	1,395.62	869.93	6,269.25	4.89
Emergency Salary	.....	1,118.07	951.62	.....
Employees' War Bonus	.....	.....	.....	1,550.75
Emergency Bonus	.....	2,374.90	.....	.....
TOTAL	$ 47,656.84	$ 43,871.29	$ 40,462.64	$ 29,271.97

WEIGHTS AND MEASURES

STATEMENT OF RECEIPTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Public Weighmasters' Licenses	$ 4,450.00	$ 4,245.00	$ 3,435.00	$ 2,682.50
Desk Presser Seals	1,025.00	1,215.00	932.50	622.50
Miscellaneous	36.09	.....	.....	.....
Tobacco Curer Permit Tags	10,975.00	.....	.....	.....
Sale of Ford Truck	.....	1,275.00	.....	.....
TOTAL	$ 16,486.09	$ 6,735.00	$ 4,367.50	$ 3,305.00

MARKETS (GENERAL FUND)

Code 6114

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Transfer to Agriculture Fund	$ 25,000.00	$ 22,110.27	$ 20,674.30	$ 17,770.39

CREDIT UNION
General Fund—Code 6113
STATEMENT OF DISBURSEMENTS
July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Salaries and Wages	$ 9,621.98	$ 6,882.25	$ 6,745.97	$ 5,960.00
Supplies and Materials	87.83	61.93	55.76	48.66
Postage, Telephone, Telegraph and Express	170.00	132.32	144.18	118.29
Travel Expense	3,562.14	2,539.58	2,510.83	2,329.68
Printing and Binding	.....	83.75	.....	20.77
Emergency Salary	.....	358.39	352.58	.....
Equipment	.....	121.30	.....	.....
Workmen's Compensation	.....	.....	25.50	.....
Emergency Bonus	.....	692.37	.....	.....
Employees' War Bonus	.....	.....	.....	624.00
TOTAL	$ 13,441.95	$ 10,871.89	$ 9,834.82	$ 9,101.40

CREDIT UNION
STATEMENT OF RECEIPTS
July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Examination Fees	$ 6,804.40	$ 5,616.05	$ 4,381.65	$ 3,319.91
Transfer from Code 1101	2,500.00	2,500.00	2,500.00	2,500.00
TOTAL	$ 9,304.40	$ 8,116.05	$ 6,881.65	$ 5,819.91

JAPANESE BEETLE CONTROL
General Fund—Code 6111
STATEMENT OF DISBURSEMENTS
July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Salaries and Wages	$ 1,856.63	$ 1,401.60	$ 1,343.60	$ 1,613.90
Supplies and Materials	5,382.37	2,012.16	1,005.90	675.52
Travel Expense	184.15	219.94	109.45	161.95
TOTAL	$ 7,423.15	$ 3,633.70	$ 2,458.95	$ 2,451.37

BANG'S DISEASE
General Fund—Code 6052
STATEMENT OF DISBURSEMENTS
July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Indemnity Diseased Slaughtered Livestock	$ 11,988.84	$ 12,751.75	$ 11,247.84	$ 12,858.32

N. C. STATE MUSEUM

General Fund—Code 6115

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Salaries and Wages	$ 14,582.28	$ 9,997.56	$ 11,360.96	$ 10,085.73
Salaries and Wages, Extra	840.00	561.69	600.00	600.00
Supplies and Materials	377.93	277.69	252.96	255.50
Postage, Telephone, Telegraph and Express	151.55	126.29	168.12	138.43
Travel Expense	204.73	170.77	170.59	34.13
Printing and Binding	232.06	27.12	49.51	99.04
General Expense	155.22	111.30	46.11	146.75
Equipment	100.60	492.00	151.58	9.83
Emergency Salary	.....	480.00	571.33	.....
Emergency Bonus	.....	1,062.00	.....	.....
Employees' War Bonus	.....	.....	.....	1,048.77
TOTAL	$ 16,644.31	$ 13,306.42	$ 13,371.16	$ 12,418.18

TUBERCULOSIS AND GLANDERS

General Fund—Code 6051

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Indemnity Diseased Slaughtered Livestock	$ 75.00	$ 25.00	$ 25.00	$ 197.50

WHITE FRINGED BEETLE ERADICATION

General Fund—Code 6112

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Salaries and Wages	$ 2,175.00	$ 4,425.00	$ 4,500.00	$ 4,795.00
Supplies and Materials	5,319.35	543.20	302.26	135.68
Travel Expense	.....	.....	.....	.....
Equipment	.....	.....	.....	(27.14)
TOTAL	$ 7,494.35	$ 4,968.20	$ 4,802.26	$ 4,903.54

HOG CHOLERA WORK

General Fund—Code 6116

STATEMENT OF DISBURSEMENTS

July 1, 1944—June 30, 1948

	1947-48	1946-47	1945-46	1944-45
Salaries and Wages	$ 4,780.00	$ 1,195.00	$ 2,070.00	$ 2,220.00
Supplies and Materials	3.92	.....	.....	2.15
Postage, Telephone, Telegraph and Express	.....	.....	.....	.....
Travel Expense	2,610.59	663.36	904.91	1,009.19
Printing and Binding	.....	.....	.....	1.77
General Expense	.....	.....	1.40	2.50
Emergency Salary	.....	50.00	90.00	.....
Employees' War Bonus	.....	.....	.....	216.00
Emergency Bonus	.....	101.25	.....	.....
TOTAL	$ 7,394.51	$ 2,009.61	$ 3,066.31	$ 3,451.61

PURE FOOD CONTROL

General Fund

STATEMENT OF DISBURSEMENTS

July 1, 1947—June 30, 1948

	1947-48
Transfer to Agriculture	$24,000.00

MILK INSPECTION

General Fund

STATEMENT OF DISBURSEMENTS

July 1, 1947—June 30, 1948

	1947-48
Transfer to Agriculture	$15,000.00

E. W. CONSTABLE

DIVISION OF CHEMISTRY

E. W. CONSTABLE

The work of the Division of Chemistry involves the checking and analysis of commercial fertilizers, fertilizer materials, commercial feeds, insecticides, fungicides, liming materials, and land plasters, for labeling, composition, adulteration, and compliance with guarantees; also similar checking and analysis of foods, drugs, and cosmetics, devices and linseed oils, including the added factors of wholesomeness and safety as these involve public health and welfare. The bearing of these activities on crops, plants, domestic animals and poultry, and finally on the health and welfare of human beings is obvious.

FERTILIZERS, FERTILIZER AND LIMING MATERIALS

All mixed commercial fertilizers and fertilizer materials are analyzed for the major plant food elements—nitrogen, phosphate and potash—also for their acid-forming or acid-neutralizing qualities. Coverage for the two biennia, 1944-46 and 1946-48, was as follows:

	1944-46	*1946-48*
Official Fertilizer Samples	12,480	16,049
Fertilizer and Fertilizer Materials for Farmers	99	116
Official Limes and Landplasters	159	370
Miscellaneous Limes and Landplasters	8	7
TOTALS	12,746	16,542

The number of fertilizer samples analyzed during the years 1944-46 and 1946-48 was the largest yet undertaken by the Department in any similar period of time. As compared to the 1942-44 biennium, the increase in number was 1,531 and 4,062 respectively. The scope of the work involved can be more fully viewed in the light of the multiple analyses required for some

Making analyses of potash in commercial fertilizer.

Determining chlorine content of fertilizers.

of the elements—two to three for nitrogen and two for phosphates. In addition, for the two periods respectively, approximately 15,000 and 18,500 analyses were made for other elements —calcium, magnesium, chlorine, sulphur, boron and manganese. Limes were checked for calcium, magnesium, and acid-neutralizing value; landplaster for calcium sulphate.

On the whole, the results of analyses for both biennia showed these products to be of good quality and to measure up to guarantees. Exceptions, which were limited and for which corrections were made, were judged to be due largely to miscarriage in manufacture and to difficulties characteristic of abnormal times.

Indivdual reports of analyses were sent to those immediately concerned as promptly as operations would permit. All reports collectively were made available to the public annually in "The Bulletin" of the Department.

COMMERCIAL FEEDS

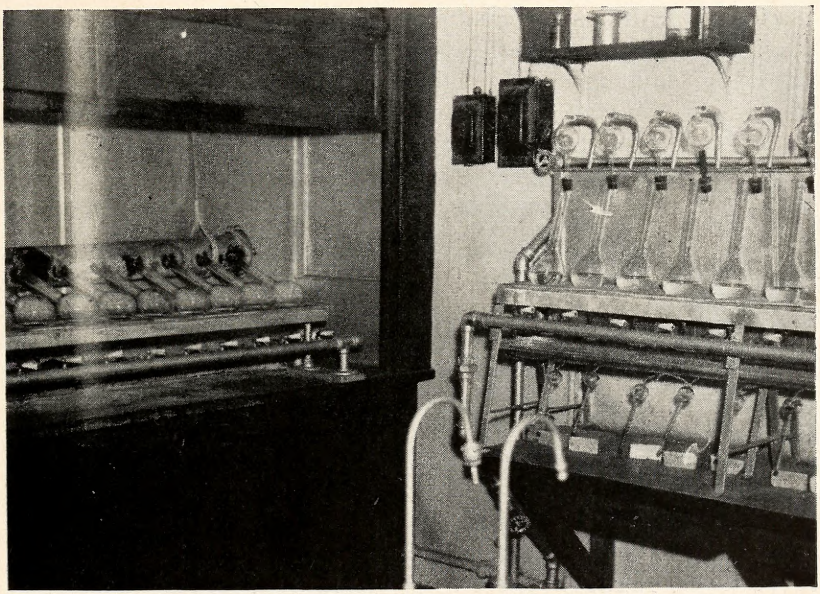
Conditions involving commercial feeds appeared at times to be more disturbed during the last year of the 1944-46 biennium than during the war period. The supply of ingredients often was short and at times uncertain in character, the volume of finished product inadequate. These conditions were much improved later, particularly during 1946-48. In order to maintain the most advantageous balance practicable under difficulties and later to return to prewar levels, an extended program of sampling and analysis was required. Under such a program, the Department reached its highest coverage for any like period of time. In comparison with the biennium 1942-44, the increase for the two succeeding two-year periods was respectively, 782 and 1,297. The coverage for the four years was:

	1944-46	*1946-48*
Official Feed Samples	4,100	4,410
Unofficial and Miscellaneous Samples	335	540
TOTALS	4,435	4,950

These feeds were analyzed chemically for content of protein, fat and crude fibre, and were examined microscopically for identification of the specific ingredients of which they were composed. Additional analyses were necessary at times in checking for possible poisons and other foreign substances.

With relatively minor exceptions, results of analyses showed that commercial feeds had been held up to a reasonably acceptable level during difficult times, and also brought to a satisfactory postwar position. Extended surveillance obviously played a large part in achieving these goals.

Reports of analyses were made promptly to those immediately concerned. Reports showing deficiencies were made public periodically in the "Agricultural Review". Seasonal results were made available to the public annually in "The Bulletin".



Apparatus used for determining protein content of feed.

INSECTICIDES AND FUNGICIDES

Economic poisons, of which agricultural insecticides and fungicides of the older types occupy a decreasingly conspicuous place, have continued to appear in larger numbers and in broader effectiveness. Various weed and grass poisons, defoliating chemicals such as used in connection with mechanical cotton picking, chemicals to control the premature falling of fruits, and the new and more powerful insect and rodent poisons have appeared. That the circumstances connected with the marketing of such products can cause confusion and injustice, particularly in the hands of the overzealous or unscrupulous, was pointedly demonstrated in the release of DDT following the war. Large vol-

umes of preparations, supposedly containing this chemical, were sold at high prices. Many were ineffective and created general dissatisfaction and complaint. Since DDT was a general purpose insecticide, applicable for both general and agricultural uses, and since the insecticide law in effect at that time covered only agricultural insecticides, the authority of the law to cover such situations was questioned. Obviously, the large and growing field of economic poisons required fuller coverage and attention to assure reasonable effectiveness, safety and fair-dealing.

A new insecticide law covering economic poisons generally—agricultural, industrial and domestic—was passed by the 1947 Legislature, becoming effective January 1, 1948. This law was made as complete as the collective experience and foresight of specialists, control officials and manufacturers could make it. In as far as practicable, uniformity with Federal laws and those of other states was effected. Under it 1,193 brands of insecticides have been registered to date. Obviously, the new law affords greater consumer protection. A fuller measure of this will be a product of time.

The problems of control in this field have expanded in far greater proportion than merely the number of items added, due to the elaborate complexity of new chemicals and to similar requirements in chemical analyses. Department facilities and personnel were inadequate. Funds were appropriated to employ one additional chemist and to equip a laboratory for the work. In view of the rapid growth in this field in new products and in new and expanded applications, these provisions already appear inadequate. It is not unusual to find a farmer's expenditures for insecticides approaching, and at times parelleling those for his fertilizers.

The official samples of insecticides and fungicides for the period of this report were 306 in number, distributed as follows: lead arsenate 114, calcium arsenate 52, magnesium arsenate 30, paris green 36, bordeaux mixture 52, and other copper fungicides 22. These in general appeared satisfactory and in line with guarantees.

HUMAN FOODS

The overall purpose of the work of the Division as carried out under the North Carolina Food, Drug and Cosmetic Act and the various supplementary laws dealing with bakeries, bottling plants, flour and its products, corn meal, oleomargarine and lin-

seed oil, is to assure the public of being provided with clean, wholesome and safe food and drugs and other products of satisfactory quality. Essential features in carrying out the purpose of these laws are the routine collection and analysis of samples, the checking of labeling, and the inspection for sanitation in, and preservation of, these products while being processed, packed, stored or sold in plants and storages of all kinds and in vehicles of transportation.

The initial policy of enforcement is advisory and cooperative so far as this can be applied. Manufacturers and dealers in general have been responsive to this. In most cases it is unnecessary to do more than cite requirements under the law, showing wherein they promote the safety and welfare of both suppliers and consumers.

It appears to be the policy of a majority of producers and dealers to maintain high standards and to operate sound businesses. Regrettably, there is among the minority the careless, the indifferent, and those lacking in foresight, who constantly create hazards and who are the cause of accidents. There are also the unscrupulous who purposely set out to defraud, and who callously inflict loss and injury on others. Usually the full force of the law and courts is necessary in curbing hazards from these sources, particularly the latter. Cases of deliberate fraud and willful disregard of consumer welfare have more often originated outside the State. The Division has stopped the sale of and destroyed large volumes of products from such sources and has worked cooperatively with federal authorities in bringing the offenders to trial. In two such prosecutions, one involving poisonous preservatives in foods, the other involving gross and premeditated adulteration, convictions have resulted.

One of the most general sources of danger is accidents arising from lack of foresight, or from carelessness, indifference, or ignorance. These can inflict injury and even death, as was evidenced by more than 100 deaths due to poisoning from sulfanilamide elixir, and by the cases of illness among babies caused by one lot of Castoria. This danger is demonstrated also by instances of food poisoning, particularly in groups. The most serious of these coming to the attention of the Division involved approximately 70 individuals, resulting in illness extending from severe alimentary disturbance and debility to several days' hospitalization. The ideal plan in dealing with these liabilities

would be to eliminate them altogether. Obviously, the practical plan is to hold them to an absolute minimum.

PLANT INSPECTION

A very effective means of controlling the food and drug supply so as to insure healthful products is the regular inspection of plants in which they are manufactured. A well planned and properly operated plant will be relatively free of difficulty. A poorly planned or carelessly operated plant virtually guarantees trouble. In the absence of inspections, most operations tend toward neglect or carelessness. Emphasis is maintained on the sanitary production and handling of products originating within the State. For those coming from sources outside the State, attention is focused on the products themselves.

When food processing plants are found operating under unsatisfactory conditions, if of a minor nature, immediate correction is required. If the defection is more serious, the plant is required to close, either voluntarily or by more drastic action, and remain closed until reinspection by the Department qualifies it as being in a condition to operate in compliance wtih the law. Court action is taken where circumstances so indicate. Summaries of plant inspections and closings for the four-year period follow:

PLANT INSPECTIONS

	1944-46	*1946-48*
Bakeries and doughnut plants	1140	2076
Bottling Plants	1084	1588
Ice Cream	239	----
Miscellaneous	940	1562
TOTALS	3403	5226

PLANT OPERATIONS SUSPENDED

	1944-46	*1946-48*
Bakeries	49	38
Bottling Plants	14	14
Meat Processing Plants	5	----
Candy Plants	1	----
TOTALS	69	52

Another item of pointed concern in inspections is the checking of all food products for proper, honest and informative labeling. Many defects are obvious from field inspection. Others can be determined only through chemical analysis. Minor defects are handled on an advisory basis. In case of gross defects the products are withdrawn from sale until corrections are made. In case of apparently premeditated fraud, more drastic measures are employed. Such inspections average approximately five thousand per year, resulting generally in the maintenance of satisfactory labeling.

ADULTERATION AND MISBRANDING

In general, if a food or drug within itself does not meet the requirements of the law, it will classify under either adulteration or misbranding. Products often are violative in both respects. The term "adulteration" covers all conditions which may render these products unfit or unsuitable for their proposed or intended uses, as, for example, the presence of substances coming from spoilage or decomposition, of poisonous or deleterious substances, filth, vermin, foreign objects or materials, also substitutions, abstractions, failure to meet standards or definitions, and exposure to insanitation. All of the conditions cited in a following section on "Spoilage, Filth, Insect Infestation, etc.", represent adulteration. These classify largely as accidental or unintended. An even more reprehensible type is that which is deliberately planned and intended to defraud.

Proper branding or labeling may be stated as conveying to the purchaser the full truth about a product. It is not permissible that labeling be false or misleading in any particular. It must show the name of the product, the name and address of the manufacturer or person responsible for it, the net contents, and in case of products not defined or fixed by standard, a list of ingredients. Drugs require additional information for safety and proper use.

The actions carried out by the Division through a two-year period, involving adulteration and misbranding, (not including products damaged by fires, storms and floods), resulted in embargoes as follows: for adulteration only, 532 embargoes involving 510,155 pounds of products; for misbranding only, 95 embargoes involving 16,601 pounds of products; for both adulteration and misbranding, 475 embargoes involving 1,165,681 pounds.

Total, 1102 embargoes, 1,692,437 pounds. These figures serve more to show the conditions which were found rather than to display volume.

SPOILAGE, FILTH, INSECT INFESTATION, ETC.

Contamination, infestation and spoilage continuously render enormous quantities of food products unfit for human use, cause large economic losses and constitute a never-ending hazard to health and offense to human decency.

In one instance the storage and the entire raw-product supply of a large bakery was found heavily infested with vermin. Finished products for the week-end sale had been prepared from this source. The situation appeared to be the result of careless-

Destroying improperly processed tomatoes.

ness rather than of intent to violate the law or to dismiss consumer welfare. Regardless of intent, however, the results from a consumer point of view were nauseous. The entire stock of raw and finished products, estimated at a value of $5,000.00, was destroyed.

Such occurrences, in the majority of instances, appear to be due to carelessness rather than intent. In many instances they are voluntarily reported to the Department with a request for instructions as to disposal. Too often, however, there is a tendency to attempt salvage for human use. To say the least, the latter tendency merits rather energetic discouragement. The Division proceeds on the basis both of education and discouragement.

During a two-year period, there were among the items placed under embargo and later destroyed or denatured and turned to uses other than for human food, 99,285 lbs. flour, largely infested with weevils or contaminated with rodent excreta and filth; 28,999 lbs. of cake mix largely weevil-infested; approximately 10,000 lbs. of bakery supplies of various kinds, infested with insects, weevils or maggots; approximately 20,000 lbs. of powdered milk, largely infested with insects or contaminated with rodent filth; 20,000 cut herring, maggot infested; 68,233 lbs. raisins, infested with worms.

Fuller detail appears in following tabulations. It is realized that in these figures only a limited portion of such conditions are represented. They are more a matter for demonstration than of measurement.

Economic Cheats

Products may be classified as economic cheats when ingredients of value have been omitted or abstracted, when they contain cheap or worthless additions or substitutions, when they are made from inferior or damaged ingredients, or when preservatives are substituted for proper care and sanitation in processing. Some may be relatively harmless except for the lack of nutritional values. Examples are shells in peanut butter and cocoa, saccharin substituted for sugar and ground corncobs in meal. Others may be directly harmful, for instance, mineral oil or poisonous preservatives in foods.

These economic cheats usually emanate from two sources—those whose plan of business is fraud and deceit, and those who, under business pressure or opportunity, take a chance on cutting

corners. A flagrant case in example was cocoa, containing a large per cent of ground cocoa shell, shipped into the State by an Ohio firm. Many tons of this product were destroyed. The principal of the firm, in addition to a heavy fine, served a prison term under Federal sentence. For use in the trial, the Division submitted its record of 84 embargo actions against these products.

Destroying mayonnaise containing mineral oil.

Another example is the substitution of mineral oil for edible oils in mayonnaise. Proceeding under 98 embargo actions, large quantities of this product, all manufactured outside the State, were destroyed. Other cases in which mineral oil was found substituted for edible fats and oils included popcorn, potato chips, candy and cooking oil. The idea seemed to prevail that mineral oil in foods was harmless. The caution that it should not be used too close to mealtime, which accompanies the oil when sold as a drug, appeared to be overlooked. That it could interfere with digestion and assimilation seemed not to have been generally known. At present, however, wholesalers and distributors appar-

ently have eliminated from their stocks food products containing mineral oil, and no repetition of sale has yet been found among merchants who have had such products embargoed in their establishments. Itinerant truckers continued to gamble with this type of business for a time, but it now appears to have been driven from the market.

An example of an economic cheat by omitting a valuable constituent was the sale of large quantities of sugar-curing meat salt. The common practice in sugar-curing meat is to include ten percent or more sugar in the salt. Competitive selling resulted in flooding the eastern part of the State with this commodity ranging in content of sugar from approximately one percent to none. It was labelled, bargain priced and sold as "sugar cure". The sale of honestly labelled and normally priced products of this class was greatly depressed. Under 53 embargo actions, 585,300 pounds of the product were removed from sale. Correction was made under court action.

Other forms of adulteration which have appeared from time to time are the use of so-called sugar-stretchers or extenders and the substitution of saccharin and similar chemicals for sugar. The voluntary use of saccharin is a matter of the individual's choice. Its use as a substitute for sugar in products offered for sale is not permissible.

The Division's activities in connection with these adulterations are not considered to have fully covered the field. It is felt, however, that they have been an effective deterrent and a safeguard to human health and welfare.

POISONOUS PRESERVATIVES

The use of chemical preservatives in foods is discouraged generally. Even the so-called "harmless" ones, often known as canning powders, encourage the substitution of mild embalming in place of sanitation and the proper selection and processing of raw products. Poisonous ones in no case are permissible under the law. Two of the poisonous types—fluorides and monochloracetic acid—were found in use.

Large quantities of beer shipped into the State, in addition to containing filth, insects and other foreign matter, were found to contain a soluble fluoride. This is a poisonous element used in roach powder. Large quantities of this beer were destroyed in the State or transferred to the U. S. Food and Drug Adminis-

tration for action on an interstate basis. The manufacturers were convicted and penalized accordingly.

The chemical, monochloracetic acid, in order to comply with Federal law for interstate shipment, must be labeled "Poison". Quantities of preserving mixtures containing this chemical were found in the State, having been shipped in ostensibly as a chemical, but intended for use in soft drinks, under the representation of being harmless and permissible. A "clean-up" campaign was promptly started, aided by the State Bottlers Association under their policy of cooperation. Upon learning the nature of the product, bottlers of soft drinks willingly cooperated. No extensive use of the product by North Carolina bottlers came to the attention of the Department.

Quantities of syrup and concentrates for making soft drinks, coming from outside sources and containing this chemical, were located, both on information from the Federal Department and through the work of the Department's inspectors. Instances of illness caused by the product were reported from a number of states. One bottler, upon being advised of the situation, immediately collected drinks already delivered and brought them in to be destroyed. All products found to contain this preservative were placed under embargo and either destroyed or transferred for action on an interstate basis. No evidence has been found of North Carolina producers knowingly using a poisonous preservative. Knowledge of the liability involved is a preventive.

Another flagrant case of adulteration with a poisonous preservative involved wine shipped into the State, containing monochloracetic acid. Over 20,000 bottles of such wine were embargoed. Portions were both destroyed by the State and transferred to the Federal Food and Drug Administration for prosecution on the basis of interstate violation. Both Federal and State Departments, individually and cooperatively, are particularly diligent in preventing the use of such substances in foods.

ANALYSIS OF OFFICIAL SAMPLES

The analysis of samples is a key factor in the enforcement of the food and drug laws. Certain types of violation are apparent upon field inspection, but in a greater majority of cases laboratory analysis is the criterion and determining factor. This work is exacting in character and must be of a high level. Careful selection must be exercised in collecting samples. Failure in this would rapidly overload laboratories with needless work of

a tedious and time-consuming nature. Department inspectors collected 1,204 official samples throughout the State during 1944-46 and 904 during 1946-48. These were subjected to appropriate inspections and analyses—chemical, physical, microscopic and optical. The results are largely reflected in items given in various parts of this report. Failure in compliance with the law was due usually to various forms of adulteration as discussed in the section of this report on that subject, or to absence of, or incorrect, labeling, failure to meet standards, and to economic cheats. Where results of analysis showed failure to comply with the law, reports were sent to the manufacturers, dealers, or others concerned. If failures were of a minor nature, reasonable time was allowed for correction, or the product was held under embargo until correction was made. Where gross or repeated violation was involved, a more drastic course of action was followed.

ANALYSIS OF UNOFFICIAL SAMPLES

A number of samples, unofficial in nature insofar as the Department is concerned, are regularly sent in for analysis by city and county officials, farmers, physicians, and other citizens of the State. These represent various situations, such as foods or feeds which are suspected of being unsafe, or of having caused sickness or death; viscera and other specimens from animals suspected of having been poisoned; and water samples from sources used for boilers, industrially, and in connection with irrigation. Work of this kind is done in keeping with the policy of the Department to render useful services to citizens as far as circumstances permit and justify. Among these samples are many which are not analyzed due to lack of adequate facilities for extra work and because the results would not be of sufficient general interest or value to justify the time and cost that would be required.

PRODUCTS WITHDRAWN FROM SALE

The section of the law setting up procedures for promptly withdrawing from sale products which may endanger the public is a very effective means of protection. When the Department finds, or has probable cause to believe, that products under this jurisdiction are adulterated, or are so misbranded as to be dangerous or fraudulent within the meaning of the law, it is mandatory that they be placed under embargo and so held until all questions

of danger or fraud are cleared, or pending disposal through further processes of law. The principle followed is to avoid victimizing consumers as experimental guinea pigs. The requirement for sound judgment in this is obvious.

While affording prompt consumer protection, the procedure also greatly facilitates operations and extends efficiency. To illustrate, 1,102 embargoes were placed during the 1944-46 biennium. Most of these cases showed no evidence of intent on the part of persons in the State to violate the law, and were disposed of largely by voluntary action on the part of the holders of the products in question. The law provides for this procedure. The congestion and difficulty of trying to clear this number of cases through courts in this length of time is obvious. Most of the limited number of actions which were carried into court were handled in such manner at the request of holders of violative goods, usually as ground for recovery actions. Others were handled on voluntary judgments. There is a growing tendency on the part of merchants who find themselves in possession of violative goods to request the Department to take over.

In order to present the conditions dealt with in something more than generalizations, yet in volume suitable for this report, items are given in collected and condensed form in a following tabulation, grouped largely according to violative features, accompanied by numbers of actions and approximate quantities of products involved:

SUMMARY OF PRODUCTS EMBARGOED

	1944-46		1946-48	
	Actions	Quantity	Actions	Quantity
Flour, corn meal, cereals, cornstarch, cake-mix, bakery products (raw & finished), egg and milk powder: Insects, worms, weevils rodent damage and filth, foreign substances,	266	218,418 lbs.	134	226,925 lbs.
Meats, poultry, fish, butter, eggs, cheese: Spoilage, insanitation, maggots, misbranded, water damage	34	12,067 lbs.	58	141,245 lbs.
Raisins, dried fruits, cocoanut (imitation) candy, chewing gum, popcorn, peanuts: Insects, worms, rodent filth and damage, mineral oil mislabeling	130	90,317 lbs.	75	28,204 lbs.
Coffee (imitation), cocoa, sugar, sugar substitutes, ice cream: Adulterated, misbranded, insanitation, filth	48	39,511 lbs.	15	4,118 lbs.
Canned goods——Meats, fish, vegetables, Fruits, kraut, canned milk, etc.: Misbranded, slack fill, substandard, spoiled, rusting	135	200,825 lbs.	44	359,118 lbs.

Fruit cakes, honey, oleomargarine: Largely misbranded and short weight: relabeled or donated to charity	83	11,701 lbs.	12	25,443 lbs.
Mayonnaise, salad dressing, pimientos, molasses, syrups, beverage stabilizers, flavoring concentrates and syrups, oils—mineral and food: Misbranded, slack filled, spoiled, vermin, foreign material, misused, misbranded, poisonous preservatives	214	35,125 bot.	77	7,634 gal.
Beer and wine: Largely filth, insects, insanitation, poisonous preservatives	149	845,432 bot.	10	67,592 bot
Soft Drinks: Mislabeling, insanitation, foreign substances, saccharin	23	71,156 bot.	20	94,884 bot.
Catsup (imitation), condiments, pickles, salt, black pepper, and olives: No labels, spoiled, adulterated	20	10,603 lbs.	58	689,148 lbs.
TOTALS (Quantity in pounds)	1,102	1,692,437 lbs.	503	1,713,017 lbs.

Fires, floods, storms (See text on these)

FIRES, FLOODS, STORMS AND CHEMICALS

Fires, floods and storms cause the loss of varying quantities of foods and drugs. Ever present are the efforts at salvaging and danger is always attendant to such salvage. Fire salvage is more likely to affect scattered individuals. Floods present a greater danger in that the resulting damage and contamination may be more general and less apparent. Epidemics involving large groups are a threat.

It is the practice of the Division to give immediate attention to these catastrophes. If need be, all inspectors, or even other personnel would be shifted to an emergency area for service during development and aftermath. All stocks which are exposed so as to constitute danger are placed under embargo, then cleared or condemned as rapidly as possible. In order to minimize losses and yet to assure safety, some may be held pending laboratory checking.

Among the more serious fires dealt with during the 1944-46 biennium was a large store in Greensboro. Losses were estimated at approximately $65,000.00. The major portion of the stock was a complete loss and was disposed of by burying. A small portion (value approximately $5,000.00) was salvaged for human use. Since it was released for shipment into another state, Federal authorities and those of that state were so notified. Other small portions were salvaged for fats and stock feed. Appreciable portions of meat stocks were saved, due to the protection

afforded by cold storage facilities. Close attention is given to transfer of meats, since hurry and improvised handling under emergency is likely to result in excess exposure. This situation was handled in cooperation with officials of the Greensboro health, police, fire and sanitary departments, representatives of the company and of the underwriters, followed by a written expression of appreciation from the general superintendent of the company.

Other fire stocks of volume handled during 1944-46 were in High Point and Winston-Salem (losses in each case estimated at $10,000.00), Salisbury, Boone, West Jefferson (two), also Fallston, Burlington, Monroe and Charlotte.

Fire stocks handled during 1946-48, in approximate figures, involved quantities of products totaling 337,200 pounds, of which 93,500 lbs. were a total loss, 127,200 lbs. were diverted to secondary uses such as stock feed, meat scrap and soap fat, 116,500 lbs. being salvaged for food uses. The locations and quantities of foods involved were: Charlotte, 130,400; Asheville, 78,800; Concord, 78,700; Ellenboro, 36,000; Lincolnton, 11,700; Cherryville, 800; and Clinton, 800.

A tropical storm of major proportions in September, 1944, damaged quantities of food supplies, mostly along the northern half of the coastal area, particularly in towns and settlements along the outer banks. Most food stocks not washed away were damaged by salt water so as not to be usable. These were destroyed. Roanoke Island and Manteo suffered appreciable damage. Towns further inland—Elizabeth City, Hertford and Edenton, and the more southerly towns—Morehead and Beaufort, escaped damage to foods.

One flood of heavy proportions in September, 1945, extended along the Cape Fear River, centering the worst destruction in and around Fayetteville. The procedure followed by the Division was to place blanket embargoes on all affected food stocks, then to clear them as rapidly as receding waters would permit.

Of the stocks of food involved, approximately 25,000 lbs. of various foods, 8,000 bottled goods—milk, soft drinks, wine, beer, flavoring extracts, etc.—and a small quantity of drugs and medicines were destroyed. Property damage downstream from Fayetteville was heavy, but food and drug stocks there were little affected. The work was done in cooperation with local and emergency agencies. One agency provided an amphibious vehicle and crew.

It was the good fortune of the State to be relatively free of heavy storm losses during 1946-48.

Ammonia damage, resulting from leaks and breakdowns in cold storage plants is another cause of concern economically and in food safety. In some instances such damage is immediately apparent. In others it is latent and may not show up for a number of days, but then will result in rapid spoilage. A quick sale of food so damaged may pass the loss on to others. Seventeen embargoes were placed during 1947, involving approximately 127,300 pounds of ammonia damaged foods. Of this, 77,600 lbs. were a complete loss, 42,400 lbs. were diverted to secondary uses, 7,300 lbs. were salvaged for food uses.

DRUGS

As had been the situation for a period of years, the Division was not in a position to proceed extensively with work under the sections of the Food, Drug and Cosmetic Act which deals with drugs. Two reasons for this were lack of provision for the work and shortage of qualified personnel, the latter due to a large extent to salary competition from other sources. Work during and since the war period has been even more restricted than the greatly limited coverage of previous years.

In a limited way, work of an emergency nature has been carried on. This has consisted of investigations and analyses when complaints have indicated possible trouble and the following up of situations in which it appeared that dangerous drugs, the sale of which were restricted by law, were being openly sold. Two items in particular under this category are of pointed concern, the indiscriminate sale of sulfa drugs and of derivatives of barbituric acid (sleeping pills). Newspapers periodically report deaths of victims of "sleeping pills". North Carolina has not been free of the abusive use of these products. A number of rather tragic letters attesting to this have come into the possession of the Department. Notices of hearings relative to sale of such drugs without prescriptions, were being sent out at the time of this report. Strengthening of the law in order to better protect the public will be proposed.

There appear on the market from time to time drugs which are unsatisfactory or dangerous. Occasionally, death results from them. The Division is ever alert to follow up these alarms, stopping the use of such products and removing them from sale. Instances of activity along this line, in cooperation with the

Federal Department, were: calcium gluconate solution for intravenous injection which was decomposed and dangerous; benzoic and salicylic acids and products made from them on which labels were confused, thereby rendering them dangerous; glucose in normal saline and dextrose in isotonic solutions which were contaminated with mold and live bacteria; castor oil, which had caused serious illness as a result of confusion with turpentine and of crossing labels; and analbis suppositories to which fatalities with children were attributed because of confusion in sizes and dosages.

Several instances of questionable drug products have been investigated, particularly where local advertising was of much greater elaboration than the immediate labeling of the product. It was significant that these products (with their labeling) had moved in interstate commerce while the advertising had not. The purchase of official samples, or the mere interest of the Department in such situations, has resulted in the disappearance of both advertising and product.

These instances exemplify trends which are to be expected in the absence of a reasonably adequate control program. By way of competition, a whole field of trade can be forced into bad habits by a few who get out of line. Unfortunately, these are always present. Sound business, as well as the public, needs the protection of an adequate drug control program.

OLEOMARGARINE

The State Law covering oleomargarine was changed by the 1945 Legislature to permit the sale of the colored product for household use. Only the uncolored product can be legally served in public eating places, and where it is served, an appropriate sign must be displayed.

So far as the Division has been able to survey the field, operations appear to have remained in good order and the products appeared to be of satisfactory character. A few exceptions have been the marketing of below-standard products, misbranding and failure to properly display signs. These were corrected without difficulty.

LINSEED OIL

As was the situation throughout the war period, pure linseed oil was either unavailable or scarce. For a time there appeared only compound, imitation and substitute oils. As an expedient

for stretching the supply these served very well. The market for high grade paints, however, does and will continue to suffer until pure oils are available.

Provisions are made in the law for these replacement oils. They have their place both in emergencies and for certain uses. Expediency during an emergency can be expected to cause disorder which must be corrected upon return to periods of more normal supply. Work is in progress now for clearing from this field difficulties and irregularities which were inherited from the war.

COOPERATION WITH OTHER AGENCIES

It is the policy of the Department to cooperate fully with other agencies. A regular program of this nature is maintained with those in the same or kindred lines of work—The State Board of Health, city and county health and sanitary departments, the North Carolina Board of Pharmacy, the federal and other state food and drug divisions, and various state and national organizations such as those of bottlers, bakers and millers.

Contact is maintained with city and county health and sanitary departments in the State. These, at various times, call on the Division for aid or for joint operations, and they likewise respond to similar requests. This has been very helpful in cases of emergency, especially so at times when the Division was handicapped by a shortage of personnel.

Cooperation with the Federal Food and Drug Administration has been of particular value in curbing shipment into the State of products adulterated both fraudulently and with poisonous preservatives. When such products were found, special effort was made to embargo them as extensively as possible; however, the Department could proceed only against the goods. Reimbursement not being a feature of such businesses, losses fell on merchants in the State. When lots of such goods were transferred to the Federal Department, the jurisdiction of which is nation-wide, violators could be reached. In two cases of particularly flagrant violation, conviction with heavy fines and one prison sentence resulted.

Especially large lots of three commodities—syrups, cocoa and beer—have been involved. Callousness in court is no asset to defendants; therefore, losses to merchants in the State generally have been made good. Such questionable business has fallen to

a low stage in the State; the former "laughing across the State line" has changed to a more somber attitude.

LABORATORIES AND EQUIPMENT

Laboratories and equipment are subject to heavy wear and corrosion. Excepting some renovation and new construction which was completed just prior to the height of the emergency period, the laboratories are in greater disrepair than at any previous time. Because of the scarcity of materials and the difficulties in getting construction work done, it was not possible to put into effect during 1944-46 renovations and replacements already provided for. The situation appeared even more acute in the early post-war period. Some improvements and the equipping of insecticide and food laboratories were gotten under way during 1946-48. However, general renovation is badly needed. It is hoped that provision for this very essential feature in control work will be made.

PERSONNEL

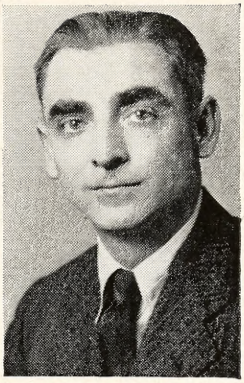
Maintaining qualified personnel has been difficult throughout the emergency, due in large part to competition by industrial organizations and federal agencies with higher salary schedules. The normal quota of food and drug chemists (four) had been reduced to one. There still is a shortage in this field. Provision for five food inspectors had been made. Two or three carried that work throughout the 1944-46 biennium. Four have carried the work during most of the 1946-48 period. It still is difficult to maintain competent personnel at current State salaries in face of outside competition. An early alleviation of these conditions is anticipated. In general character and efficiency, the work of the personnel has been of a high level.

SUMMARY

In evaluating the work of the Division for the 1944-46 and 1946-48 biennia, it appears expedient to pass over a possible burden of repetition and to summarize in a brief single statement: Vital statistics show that over a period of years the normal span of human life has increased appreciably. Wholesome and safe food and drug supplies are an important factor in this.

CREDIT UNION DIVISION

D. R. GRAHAM



D. R. GRAHAM

During the four-year period ending June 30, 1948, North Carolina Credit Unions experienced more rapid growth than during any similar period since our credit union law was enacted in 1915. During the war, government restrictions on installment credit, together with the lack of durable goods on the market, caused a considerable decrease in loans. Since durable goods are gradually returning to the market, this situation is slightly changing and during the last two years the volume of loans has increased considerably.

At June 30, 1944, there were 146 credit unions operating, having 25,006 members and $2,527,915.99 in assets. Since that time, 59 credit unions have been organized and 5 liquidated. At June 30, 1948, there were 200 active credit unions serving 41,909 members and having assets in the amount of $7,169,512.10. Of this amount, almost $4,000,000.00 was invested in loans to members and slightly under $2,000,000.00 was invested in government bonds.

Dividends continue to be held at a maximum of three per cent and some credit unions pay no dividends whatever. This situation will be corrected when loans return to normal.

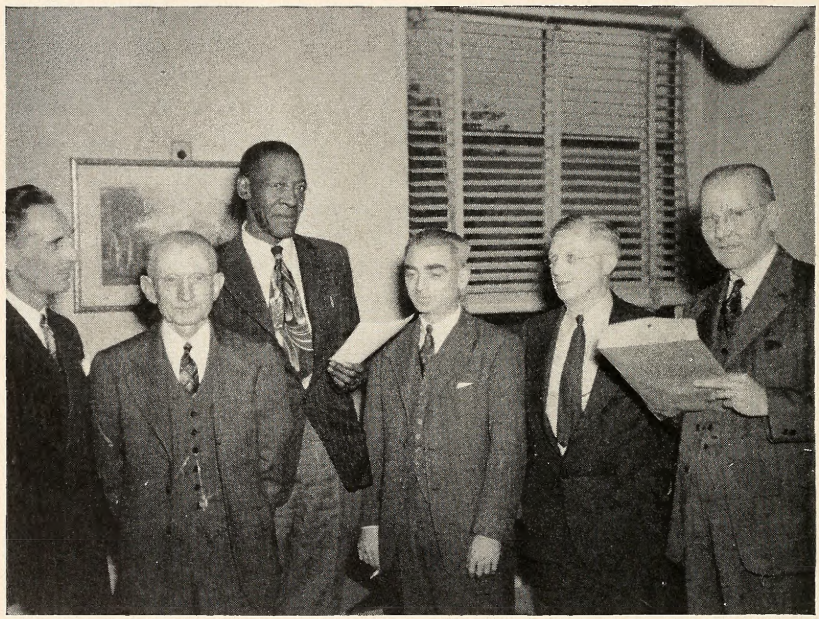
Our work among Negro rural groups has attracted nation-wide attention and we now have almost as many credit unions among such groups as all other states in the union combined. Two of these credit unions have assets in excess of $100,000.00, the total being well in excess of $800,000.00. Through their credit unions, these Negroes have built homes, bought farms, purebred livestock, cattle, sheep, and hogs. They have gone a long way toward raising themselves from submarginal status to a decent standard of living.

The record of our credit unions in the several war bond campaigns is unequaled by any organization of similar size in the country and a number of them are qualified as issuing agents for bonds.

With the rapid growth of credit unions, both in size and number, we have found it extremely difficult to comply with the law requiring that each credit union be examined once each year.

This situation has been somewhat relieved during the past three months by employing another auditor.

The North Carolina law is considered the best in the United States and a number of states have used this Act as a model. Our procedure in supervising credit unions is considered among the best. We have been called on for advice by other states and we were recently called on to assist in rewriting the accounting procedure for federal credit unions.



Educational and religious leaders discuss rural credit union program. Left to right, R. M. Grumman, Director of Extension, University of North Carolina; Dr. N. C. Newbold, Director of Negro Education, State Department of Public Instruction; S. P. Dean, Promotional Director, N. C. Council of Credit Unions and Associates; D. R. Graham, Superintendent of Credit Unions, North Carolina Department of Agriculture; Dr. Fred L. Brownlee, American Missionary Association; and Dr. Lee M. Brooks, Professor of Sociology, University of North Carolina.

Credit unions during this period of inflation when wages are not keeping abreast of rising living costs have served to tide over many of their members who might otherwise have found it necessary to borrow from other agencies at much higher rates of interest. By providing credit for their members at a reasonable rate, they have materially increased purchasing power.

We continue to stay near the top in number of credit unions organized and our liquidations have been much less than the national average.

	June 30, 1944	June 30, 1948
Active credit unions	146	200
Total members	25,006	41,909
Total Assets	$2,527,915.99	$7,169,512.10

NORTH CAROLINA CREDIT UNIONS
CONSOLIDATED BALANCE SHEET
June 30, 1948

ASSETS

Cash on Hand and in Banks	$1,031,904.75
Loans to Members	3,950,816.47
U. S. Government Bonds	1,992,279.29
Other Assets	194,511.59
TOTAL ASSETS	$7,169,512.10

LIABILITIES & CAPITAL

Shares	$5,255,663.40
Deposits	533,242.41
Reserve Fund	205,064.73
Other Liabilities	1,014,572.53
Undivided Earnings	160,969.03
TOTAL LIABILITIES AND CAPITAL	$7,169,512.10

C. W. PEGRAM

DAIRY DIVISION

C. W. PEGRAM

During the past two bienniums the dairy industry has changed from wartime restrictions and disruptions to normalcy. Rapid growth has taken place during this period. The preliminary Federal-State Crop Reporting Service report shows the milk production for 1947 was 1,529,000,000 pounds, as compared with 1,309,000,000 pounds for 1940, a gain of 14 per cent. The gross farm income was $81,177,000.00 as compared with $36,005,000.00 for 1940. This additional 45-million-dollar farm income was very largely due to the price increase. Dairying is definitely on the march throughout the State, and every encouragement is being given by all State agencies, processing and producer groups.

The Dairy Division has attempted to keep in pace with this fast growing industry. Growth or development of an industry presents new problems and increased fields of responsibility. A modern $20,000 dairy products laboratory was completed in 1947, and it has proved to be of invaluable aid in maintaining the standards of purity and sanitation. The laboratory services of the State College Dairy Department were used for some time prior to establishing our new laboratory. Modern chemical and laboratory technique applied to dairy products reveals much information as to quality and sanitation. Laboratory results supply information for intelligent field inspections.

MILK AND MILK PRODUCTS

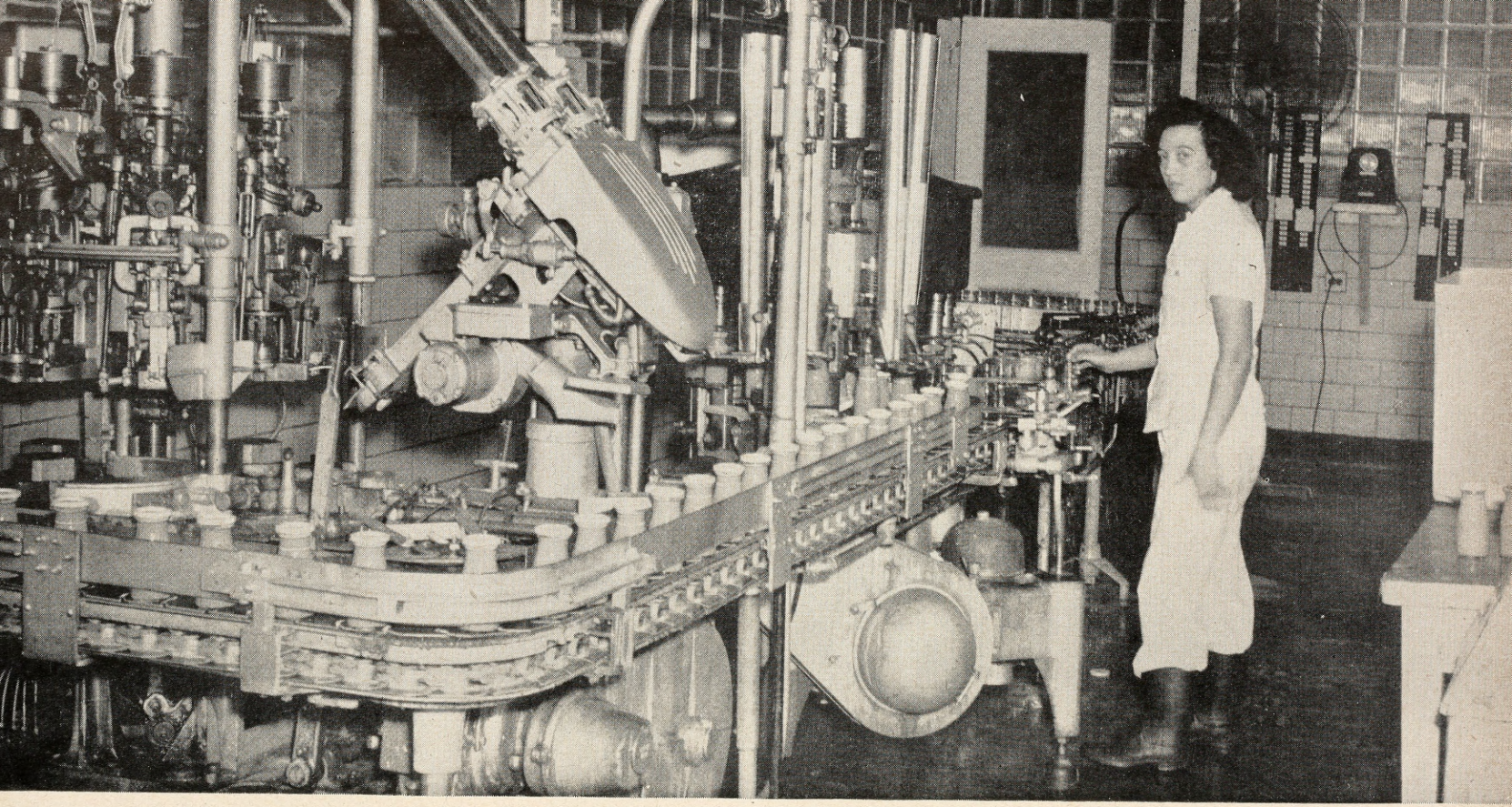
In May, 1947, the Board of Agriculture promulgated definitions, minimum standards, rules and regulations governing the handling and sale of milk and milk products. These regulations were set up under authority of the Pure Food and Drug Law, becoming effective September 1, 1947. Amendments were adopted in January, 1948, requiring permits for out-of-State shipments of milk. The Legislature appropriated $15,000.00 annually to carry out this additional activity. Adoption of these regulations materially increased the responsibility and duties of the Division.

North Carolina now has State-wide minimum regulations covering milk and milk products for the first time in its history. In the past the responsibility for milk purity and sanitation was handled largely by the local county and municipal health departments. The results for the first nine months show that this minimum State-wide control has been well justified. Due to a lack of sufficient health officers, sanitarians and laboratory services in some counties, cities and municipalities, samples have been secured and inspections have been made throughout the State. In some areas intensive work was carried on to improve the quality of the local milk supply.

A modern condensory.

This program has not been a duplication of effort, but instead it has been one of full cooperation with the State, city and county health departments. This cooperative program has resulted in marked improvement in the quality and purity of milk and other dairy products offered to North Carolina consumers. However, a study of the analyses shows that the job is not completed. It will take intensive work by all segments connected with the dairy industry to reach the desired quality goals. This is shown by the deficiencies carried in Table I.

While these samples were purchased on a State-wide basis, they were usually secured where some doubt existed about thir meeting the standards. Field follow-ups were made whenever



Interior View of a milk processing plant, showing milk being bottled and capped.

possible on samples showing deficiencies, and plants or producers having defiicient samples were notified as well as the local health officers.

TABLE I

MILK AND MILK PRODUCTS ANALYSES
(September, 1947—June, 1948)

DEFICIENCIES

Product	No. of Samples	Fat	Cyroscope Readings Above Normal	Solids not-fat	Plate Count	Pouring Lip	Label
Pasteurized Gr. A. Milk	411	10	154	79	79	24	8
Grade A Raw Milk	112	4	16	28	46	68	17
Producer Gr. A Raw Milk	148	10	67	73	29	....	....
Gr. A Raw (Bottled) Milk	6	0	3	3	1	....	1
Gr. C Raw Milk (Can Delivery)	18	2	1	1	0	....	....
Cream	72	3	....	....	17	7	13
Buttermilk	26	....	....	....	....	1	7
Creamed Buttermilk	14	8	....	5	....	....	4
Buttermilk—Gr. A Wh. Lac.	35	10	....	8	....	3	4
Chocolate Milk	56	21	....	....	10	4	22
Chocolate Drink	41	....	....	....	....	....	17
	938	68	241	197	182	107	93

MINIMUM STANDARDS FOR MILK AND MILK PRODUCTS

As Shown on Table I (as established by the Rules and Regulations Promulgated by the Board of Agriculture on May 29, 1947 and Amended on January 9, 1948)

	% Milk Fat	% Milk Solids-not-fat	Bacterial Standard (Plate Count) Grade A	Grade C
Milk, Pasteurized	3.25	8.50	30,000	.....
Milk, Raw	3.25	8.50	50,000	3,000,000
Milk, Raw—Producer	3.25	8.50	200,000	3,000,000
Cream	18.0	.....	.....	.....
Buttermilk	....	8.50	.....	.....
Creamed Buttermilk	3.25	8.50	.....	.....
Grade A Whole Lactic Buttermilk	3.25	8.50	.....	.....
Chocolate Milk	3.25	.....	30,000	50,000
Chocolate Drink	....	.....	.....	50,000

Thirty-five hearings were held regarding the adulteration of milk as this is required under the provisions of the Pure Food and Drug Law before any court action is taken. At these hearings a full explanation was given regarding the cryoscope readings. Follow-ups were made after the hearings and subsequent samples showed satisfactory results. Today the number of samples showing added water is rather insignificant.

This year considerable time has been devoted to out-of-State milk shipments. Inspections were made at the principal plants

Corner of new dairy laboratory, showing two cyroscopes used to determine added water content of milk.

furnishing this supply, and samples were secured from tankers delivering milk into the State. This activity has resulted in better milk coming into the State. It was necessary to cancel the permit of one shipper. Approximately 64,000,000 pounds of milk were imported in 1947.

ICE CREAM

Approximately 650 ice cream plant and counter freezer inspections were made annually. Samples were purchased on a State-wide basis for laboratory analyses, and results from the analyses were used on a basis for field inspections. Emphasis was placed on areas where there was indication of quality standards not being met. Despite this plan of sampling, there were noticeable improvements. Particularly significant is the improvement in the bacteria content as shown in Table II. During the period of September-December of 1944, the excess of over 100,000 bacteria was 34 per cent of all the samples, while for the period of January-June of 1948, it was 12.1 per cent. The positive E. coli declined from 39 per cent to 0.4 per cent. This represents a tangible improvement in health safety and quality.

TABLE II

ICE CREAM ANALYSES—(September, 1944—June, 1948)

YEAR	No. Samples	Deficient in Fat	Deficient in Total Solids	Excess over 100,000 Bacteria	Positive E. Coli	E. Coli (Too Numerous to count)	Positive Phosphatase	Weight
		*	**					***
1944 September-December	146	34 (23%)	73 (50%)	50 (34%)	(138 Samples) 57 (39%)	(138 Samples) 16 (11%)	(105 Samples) 3 (2%)	----------
1945	672	161(24%)	168(25%)	231(34.4%)	299(44.5%)	77(11.5%)	17(2.5%)	----------
1946	679	121(17.8%)	164(24.2%)	201(29.6%)	242(35.6%)	38(5.6%)	11(1.6%)	272(40%)
1947	465	81 (17%)	30 (6%)	115(25%)	146(31%)	27(6%)	30(6%)	150(32.2%)
1948 January-June	256	55(21.5%)	25 (9.8%)	31 (12.1%)	10 (.4%)	2(.077%)	32(12.5%)	72(28.1%)

STANDARDS:

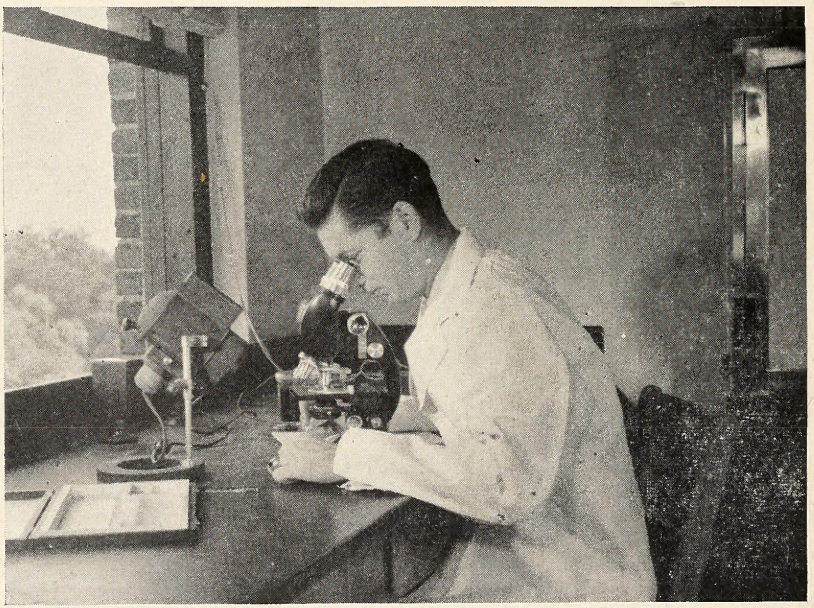
* Fat: Plain—10%
Fat: Chocolate, Fruit—8%.

** Total Solids—35%.

*** Weight:—Gallon—4.5 lbs.
Weight: Pint—9 oz.

Ice cream manufacturers have spent several millions of dollars in recent years in improving buildings and purchasing new equipment. There are now modern well-equipped plants located throughout the State.

This industry, according to the Federal-State Crop Reporting Service, shows 16 million gallons of ice cream in 1946, which ranks North Carolina as the 11th state as compared with the other states. Ice cream is no longer eaten on special occasions, but it is now considered as a basic part of the meal. It is a typically American food.



Counting bacteria by microscope.

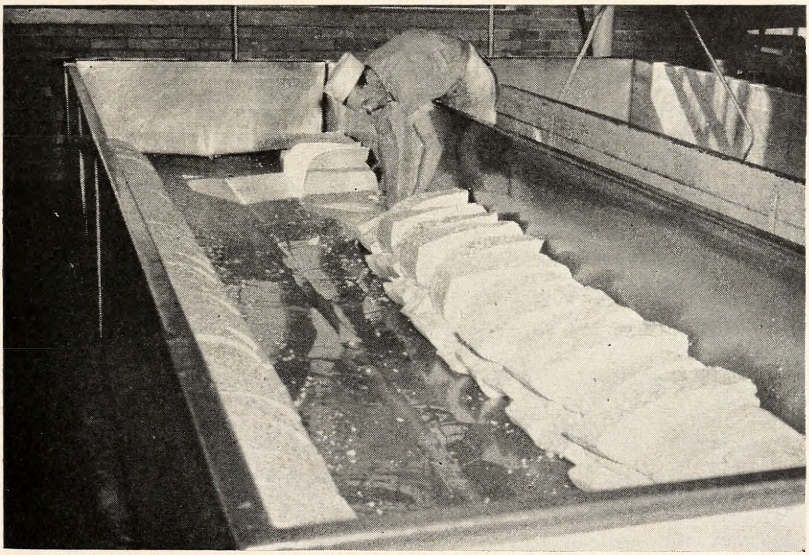
BABCOCK TEST PROGRAM

The Babcock test program has been carried on continuously during the past two bienniums. During this period there were 917 investigations at the 80 plants and stations covering 15,410 check tests. Since milk tests are subject to variations from many sources, test results are subject to suspicion. The goal of the Division is to secure accurate sampling and testing of all milk purchased on a butterfat basis. When complaints are received, investigations and follow-up tests are made. These have decreased from year to year. This work has done much to estab-

lish confidence between the producer and buyer, and it is essential for the building of a great dairy industry in the State.

MILK AUDIT LAW

The Milk Audit Law has furnished valuable information on the production, importation and sale of milk in North Carolina for the past several years. Approximately 3,000 reports have been received and verified in these two bienniums. Field investigations and the inspection of plant records are made by the auditor where sufficient information is not carried in the monthly reports. The Division has cooperated with the Division of Agri-



Interior of cheese manufacturing plant at West Jefferson.

cultural Statistics in compiling dairy statistics under the Dairy Products Manufacturing Law.

The Milk Audit Law plays an important part in the expansion program of the dairy industry in North Carolina, especially on markets where milk is purchased from dairy farmers on a classification basis, or where a surplus of Grade A milk exists. In order to establish confidence between dairy farmers and milk distributors, the Commissioner of Agriculture is empowered to establish marketing areas and to set up the classification of milk in each area after a complete and impartial hearing.

A study of the following data on milk production and milk imported from other states will show that we have made consid-

erable gains in the past few years in the production of milk in North Carolina. At the same time, fluid milk imported from other states has increased tremendously. This indicates that the consumption of milk has increased considerably above the gains made in production.

PURCHASES OF GRADE "A" MILK FROM PRODUCERS AS REPORTED BY MILK PROCESSORS UNDER THE MILK AUDIT LAW

(Pounds)

Year	Total Purchases	Class I	%	Surplus or Low-Priced Milk	%
1941 (June-December)	62,589,208	55,734,523	89.05	6,854,685	10.95
1942	120,604,163	116,830,067	96.87	3,774,096	3.13
1943	133,138,746	133,004,683	99.90	134,663	.10
1944	145,355,553	145,355,553	100.00	—o—	—o—
1945	162,646,189	162,646,189	100.00	—o—	—o—
1946	172,866,014	172,866,014	100.00	—o—	—o—
1947	206,588,879	206,588,879	100.00	—o—	—o—

MANUFACTURING MILK PURCHASED FROM PRODUCERS AS REPORTED BY MILK DISTRIBUTORS UNDER THE MILK AUDIT LAW

Year	Pounds
1941 (June-December)	31,145,376
1942	68,288,728
1943	99,794,916
1944	101,009,342
1945	118,240,781
1946	104,691,561
1947	111,228,019

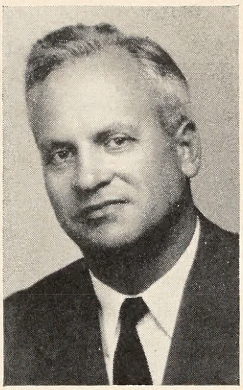
MILK IMPORTED FROM OTHER STATES BY DISTRIBUTORS IN NORTH CAROLINA AS REPORTED UNDER THE MILK AUDIT LAW

Year	Pounds
1942 (June-December)	9,100,580
1943	30,394,902
1944	26,551,071
1945	38,466,471
1946	65,063,749
1947	63,880,561

STATISTICAL REPORT

(1946-47)—(1947-48)

	Total
Plant Investigations (Check Testing)	917
Butterfat Check Tests	5,485
Butterfat Tests Supervised	4,325
Sample Tests	5,600
	15,410
Tests Found Incorrect	486
Test Notices Mailed	5,628
Special Test Investigations	200
Testers Trained	65
Ice Cream Plant Inspections	1,308
Ice Cream Samples Analyzed	1,186
Ice Cream Mix Samples Analyzed	29
Milk Samples Analyzed for Adulteration (Official	1,246
(Unofficial)	252
Milk Shake Samples Analyzed	16
Butter Plant Inspections	22
Cheese Plant Inspections	4
Sediment Tests Made	1,417
Methylene Blue Tests Made	747
Dairy Farm Inspections	231
Out-of-State Milk Permits Issued	4
Out-of-State Temporary Milk Permits Issued	22
Grade A Raw Milk Permits Issued	4
Grade C Emergency Raw Milk Permits Issued	8
Hearings Held	35



C. H. BRANNON

DIVISION OF ENTOMOLGY

C. H. BRANNON

This division is charged with the responsibility of administering the North Carolina plant pest laws and regulations. It also administers the North Carolina Bee Disease Law. The Division of Entomology cooperates with the U. S. Bureau of Entomology and Plant Quarantine in various projects, the most active of which are Japanese Beetle control and White Fringed Beetle control.

The division has probably the most complete insect collection of any Southern State. Insect identification, filing of insect records, and care of the valuable collection are important phases of the Division's work.

NURSERY INSPECTION

The annual inspection of all nurseries in the State has always been one of the most important projects of the division. Nurseries which successfully pass inspection are issued a certificate which is valid for one year. This work, carefuly carried out by J. A. Harris and Dr. D. L. Wray, occupies most of their time during July, August and part of September of each year. The nurseries have always heartily cooperated with the division, and the citizens of this and other states are guaranteed clean stock. Our nursery inspection service is recognized as one of the best in the United States and the North Carolina nursery certificate is accepted by the federal government and all states. North Carolina has approximately 225 certified nurseries.

The nursery inspection fees are as follows:

3 acres or less	$ 5.00
4 to 10 acres	7.50
11 to 15 acres	10.00
16 acres	12 50
Each additional acre	.10

NURSERY DEALER CERTIFICATE

Dealers in nursery stock are required to pay an annual fee of $10.00. This applies to individuals or stores. We have approximately fifty such dealers in the State.

PLANT SHIPPING PERMIT

This permit, previously issued to collectors of native plants, including boxwood, has been discontinued. Since the division has no way of checking on the origin and movement of such material, and since other states do not allow the movement under a blanket permit, this permit is no longer issued by the division.

BOND REQUIREMENT

A bond of $1,000 is required of all who promise (orally or in writing) later attention to nursery stock sold in North Carolina.

APIARY INSPECTION

P. G. Craddock, State Apiary Inspector since 1937, resigned in 1945. Dr. D. L. Wray has given as much time as could be spared from other duties to this important service. Dr. Wray has submitted the following results of the bee inspection work:

Apiary inspection and enforcing the bee disease laws were carried on by P. G. Craddock, State Apiary Inspector, until March 15, 1945. Since then only part time has been devoted to apiary inspection, mostly to aid beekeepers in their movement of bees into and within the State, and to certify the apiaries of queen breeders.

From July 1, 1944, to June 30, 1945—10,634 colonies of bees were inspected. Of these, 33 colonies were found infected with American foulbrood. Ten apiaries of queen breeders were inspected and certified.

From July 1, 1945, to June 30, 1946—3,400 colonies of bees were inspected. Of these, 13 colonies of American foulbrood were found. Seven apiaries of queen breeders were inspected and certified.

Much time was spent aiding beekeepers with European Foulbrood, which was found prevalent in large numbers of colonies in the eastern and central sections of the State. Other bee diseases as sacbrood, paralysis, bluebrood, etc., have received considerable attention.

Since 1946 considerable attention has been devoted to the observation of the use of sulfa drugs in the treatment and control of American Foulbrood. Many beekeepers in the Piedmont and mountain sections of the State have been getting gratifying results by using sulfathiazole. After use of this drug in colonies that were highly infected with the American Foulbrood organ-

isms, the bees cleaned out the brood combs and raised normal, healthy young brood. Sulfathiazole was used at the rate of ½ gram to the gallon of sugar syrup prepared and fed to the bees in the usual way. Usually a gallon of treated syrup per colony was sufficient to prevent or clean up the brood combs. Of course there are several points to clear up yet in this treatment, but the results look promising and it may prove the best thing yet to aid in controlling this bee disease.

Considerable time was spent in inspecting bees that were to be moved from this State to other states. Also the handling of permits for the entrance into this State from other states of bees received much attention.

Beekeeping has expanded greatly during the past biennium, due to the shortage of sweets and higher prices for honey and beeswax. Most of this expansion is found among sideline beekeepers. Scarcity of beekeeping equipment in large quantities has curtailed somewhat the expansion of the larger commercial apiaries. This expansion has added greatly to the bee disease problems inasmuch as many bees and equipment are moved around from one place to another, causing a greater risk in scattering disease. Much time has been spent in checking on the movements of these bees to prevent the transporting of disease from one area to another.

The greater movement of bees is from the eastern half of the State to the western half and vice versa in order to take advantage of the additional honey flows. The State was divided into two parts in 1938 for bee disease control purposes, the eastern half declared a clean-up area, and bees that are to be moved into that half of the State from the other sections must carry a permit. Much progress has been made in this clean-up area and American Foulbrood no longer causes great losses to the beekeepers, but there is always enough remaining to require constant checking and inspection to keep it under control.

Much inspection work is needed in the Piedmont and Mountain areas in order to make any progress in keeping disease at a standstill. The beekeeping industry has expanded to a point that it, along with other agricultural products, has reached a high value. Bee disease control is essential if we have profitable beekeeping in the State, and have bees to pollinate orchards and farm and garden crops.

Apiary inspection work during the past year has been given mostly to the queen bee rearing apiaries and other larger bee-

keepers who move bees within and into the State to take advantage of North Carolina's fine climatic conditions and excellent seasonal honey flows. During the past year a number of large queen breeding apiaries were inspected and certified as being free of disease. From these apiaries queen bees and bees have been shipped all over the U. S., Canada, Mexico and to war torn European countries. North Carolina beekeepers are aiding materially in rebuilding apiaries destroyed by war.

During the 1946-48 biennium approximately 8,000 colonies of bees were inspected for diseases and for movement within North Carolina and into other states.

JAPANESE BEETLE QUARANTINE AND CONTROL

The Division of Entomology maintains a State Japanese Beetle Quarantine in cooperation with the U. S. Bureau of Entomology and Plant Quarantine. J. B. Riley, who is situated in Greensboro, has charge of the enforcement of this quarantine.

The Japanese Beetle quarantine area includes:

Buncombe County: Townships of Asheville, Limestone and Swannanoa.

Forsyth County: Townships of Broadbay, Middle Fork, Old Town, South Fork and Winston-Salem.

Guilford County: Townships of Morehead and Gilmer.

Henderson County: Township of Hendersonville.

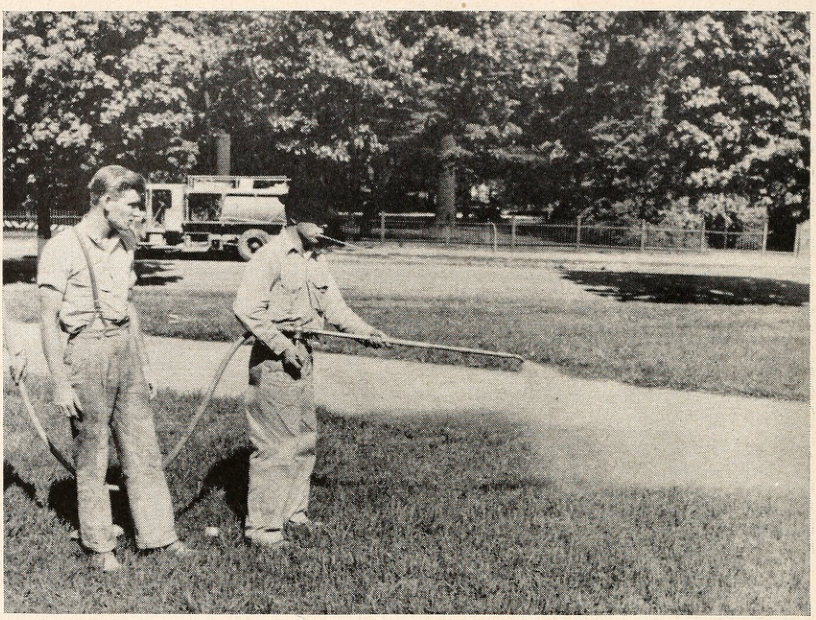
Mecklenburg County: Township of Charlotte.

Rowan County: Township of Salisbury.

The Japanese Beetle Quarantine regulation reads in part as follows: "No nursery, ornamental or greenhouse stock, or other plants, plant roots, or sand, soil peat, compost or manure should be transported in any manner from the said infested areas to or through any other part of the State of North Carolina, unless a special permit shall have been issued therefor by the North Carolina Department of Agriculture."

Nursery and greenhouse operators and dealers, after proper inspection, are issued without charge special Japanese Beetle certificates, one of which must accompany each shipment of quarantined materials out of the quarantined area. Approximately 3,000 Japanese Beetle certificates are issued each year.

Japanese beetle traps are placed in certain areas during the summer in cooperation with the U. S. Bureau of Entomology and Plant Quarantine to determine the spread of the beetle.



One method of treatment for control of Japanese Beetles is to spray the soil in infested areas with DDT to kill the grubs. Special spraying equipment is furnished by the federal government.

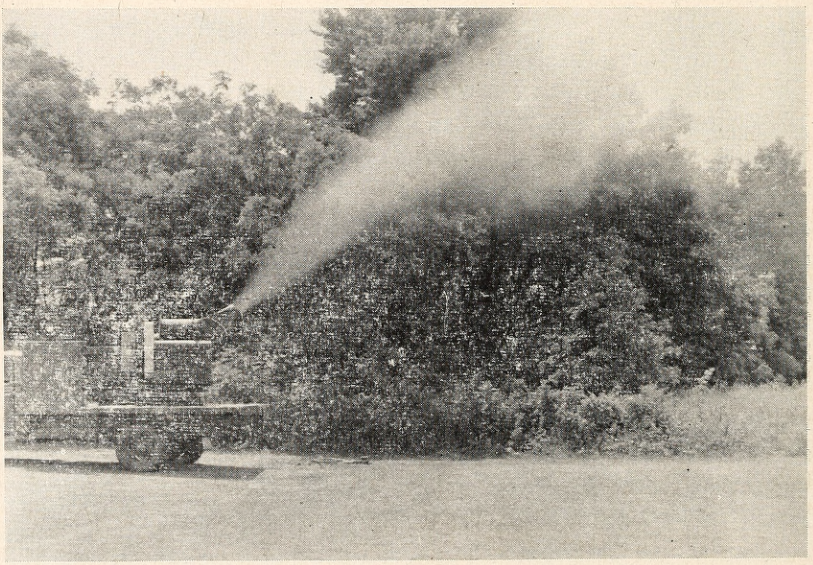


Photo by USDA Bureau of Entomology and Plant Quarantine

At another season mist-blown DDT is used to combat Japanese beetles. This special high-power blower also is furnished by the federal government.

During June, July and August, 1945, the following traps were placed: Archdale, 10; Asheboro, 70; Black Mountain, 25; Blowing Rock, 487; Burgaw, 25; Burlington, 188; Candler, 23; Canton, 25; Charlotte, 275; Charlotte Airport, 25; Durham, 275; East Spencer, 25; Goldsboro, 299; Kannapolis, 65; Landis, 15; Marshall, 25; Mayodan, 25; Mt. Olive, 15; Rocky Mount, 277; Salisbury, 150; Spencer, 25; Swannanoa, 20; Tarboro, 60; Weldon, 185; Wilmington, 93; Wilson, 290; and Winston-Salem, 293.

Japanese Beetles destroyed in 1945:

Archdale, 6; Asheboro, 1; Blowing Rock, 42,271; Burgaw, 5; Candler, 1; Canton, 1; Charlotte, 3; Charlotte Airport, 2; Durham, 47; East Spencer, 32; Kannapolis, 1; Landis, 2; Mayodan, 1; Mt. Olive, 4; Rocky Mount, 5; Salisbury, 29; Spencer, 41; Swannanoa, 1; Wilson, 8; Winston-Salem, 7.

The following Japanese Beetle traps were placed in the summer of 1946:

Archdale, 25; Asheboro, 25; Biscoe, 25; Boone, 25; Burgaw, 25; Calypso, 25; Canton, 25; Charlotte, 50; Cherryville, 25; Clinton, 25; Columbia, 25; Dallas, 25; Dunn, 50; Edenton, 25; Elizabeth City, 50; Fayetteville, 50; Gastonia, 100; Greensboro, 150; Hamlet, 25; Hickory, 50; High Point, 100; Kannapolis, 25; Landis, 25; Lenoir, 25; Lexington, 50; Marshall, 25; Mayodan, 25; Mount Olive, 25; Norlina, 25; North Wilkesboro, 25; Old Fort, 25; Pinehurst, 25; Raleigh, 100; Reidsville, 25; Rocky Mount, 50; Sanford, 25; Southern Pines, 25; Spruce Pine, 25; Thomasville, 25; Troy, 25; Warrenton, 25; Warsaw, 25; Washington, 25; Waynesville, 25; West Jefferson, 25.

Airports: Charlotte, 25; Durham, 25; Greensboro, 25; Wilmington, 25; Winston-Salem, 25.

The following Japanese Beetles were collected from traps in 1946:

Archdale, 38; Boone, 2; Burgaw, 12; Calypso, 929; Charlotte, 4; Clinton, 18; Columbia, 2; Dunn, 293; East Flat Rock, 5; Elizabeth City, 4; Fayetteville, 1; Fletcher, 2; Gastonia, 4; Greensboro, 9; Hendersonville, 365; High Point, 168; Mayodan, 5; Mount Olive, 51; Raleigh, 7; Rocky Mount, 9; Thomasville, 3; Warsaw, 3; West Jefferson, 1; Wilmington Airport, 22.

JAPANESE SOIL TREATMENT

During the fall of 1944 the following areas were treated in cooperation with the U. S. Bureau of Entomology and Plant

Quarantine with 500 pounds of arsenate of lead per acre: Burgaw, 12 acres; Dunn, 35; High Point, 9; Lexington, 1½; Raleigh, 7; Salisbury, 9; Spencer, 7½; Spruce Pine 2½; West Jefferson, 4.

During the fall of 1945 the following areas were treated with 500 pounds of arsenate of lead per acre: Durham, 13 acres; Rocky Mount, 7; Salisbury, 13; Spencer, 8; Wilson, 3; Winston-Salem, 7.

Japanese Beetle traps in 1947 were placed as follows:

Route 1: Clinton, 25; Fayetteville, 100; Raleigh, 100; Wilson, 50; Rocky Mount, 50.

Route 2: High Point, 100; Archdale, 25; Thomasville, 50; Winston-Salem, 200; Lexington, 50; Landis, 25.

Route 3: Elizabeth City, 100; Greensboro, 100; Mayodan, 25; Reidsville, 50; Burlington, 100; Durham, 200.

Route 4: Charlotte, 200; Gastonia, 50; Hickory, 50; Lenoir, 25; Boone, 25; West Jefferson, 25.

D.D.T. mist-blower treatments were applied to foliage in the Asheville-Hendersonville area and in the Mount Olive-Calypso area.

Soil treatment with D.D.T. during the fall of 1947 was as follows: Archdale, 36 acres; Charlotte, 3 acres; Clinton, 22 acres; Durham, 8 acres; Gastonia, 7 acres; Greensboro, 28 acres; High Point, 40 acres; Raleigh, 25 acres; Winston-Salem, 39 acres.

Japanese Beetle traps for 1948 were placed as follows:

Wilmington area: Wilmington, 300; Burgaw, 30; Wallace, 25; Magnolia, 25; Warsaw, 50; Clinton, 100; Ingold, 25; Garland, 15; Roseboro, 25; Elizabethtown, 25; Newton Grove, 10; Mount Olive, 100; Faison, 15; Kenansville, 15; Beulaville, 15.

Rocky Mount area: Wilson, 100; Greenville, 200; Maysville, 25; New Bern, 200; Washington, 175; Williamston, 100; Columbia, 50; Edenton, 100; Elizabeth City, 300; Murfreesboro, 50; Scotland Neck, 100; Rocky Mount, 300.

Raleigh area: Dunn, 100; Fayetteville, 300; Raleigh, 600; Durham, 600.

Greensboro area: Greensboro, 600; High Point, 275; Archdale, 25; Thomasville, 300; Burlington, 300; Reidsville, 200; Mayodan, 100.

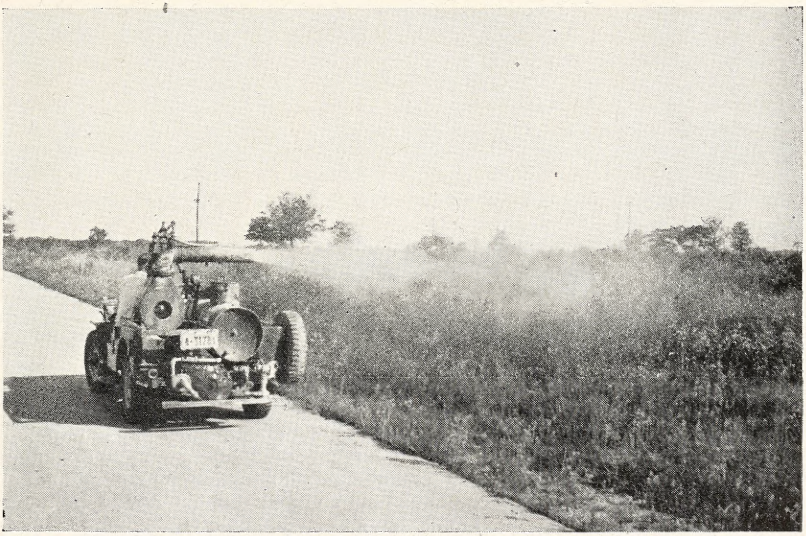
Salisbury area: Salisbury, 300; Charlotte, 575; Gastonia, 300; Winston-Salem, 600; Hickory, 200; Lenoir, 200.

D.D.T. treatments with mist-blowers and regular spray machines have been made in the Munt Olive-Calypso area in the eastern part of the State and in the Asheville-Hendersonville area in western North Carolina.

Heavy infestations during the summer of 1948 have also been found in the Pantego section of Beaufort County.

WHITE-FRINGED BEETLE CONTROL AND QUARANTINE

The White-Fringed Beetle control and quarantine cooperative project between the U. S. Bureau of Entomology and Plant Quarantine and the North Carolina Department of Agriculture



—Photo by USDA Bureau of Entomology and Plant Quarantine

This special sprayer, mounted on a Jeep, is supplied by the federal government for control of White Fringed Beetles with a concentrated emulsion and suspension of DDT.

has been continued through the past two years. The U. S. Bureau has contributed personnel, spray and dust material and equipment, and has had general supervision of the work. The State Department has contributed personnel, equipment and supplies. There has been mutual agreement in regard to control and quarantine problems.

INFESTED AREAS

At the end of the 1944 season parts of eight counties were known to be infested. These counties were: Anson, Cumberland, Robeson, Wayne, Onslow, Pender, New Hanover and Bruns-

wick. In these counties a total of 703 properties involving 9,574 acres were found infested. Inspections during 1945 disclosed infestations in parts of the seven additional counties of Bladen, Craven, Duplin, Jones, Lenoir, Sampson and Union. At the end of the 1945 season parts of fifteen counties involving 739 properties and 9,865 acres were known to be infested.

No additional counties have been found infested during the 1946-48 period. However, there has been some extension of known infestations especially in Wayne County. 1,100 additional acres will be treated with D.D.T. A mobile fumigation unit is used extensively for the treatment of such articles as nursery stock, peanuts, cotton and hay so that these materials may be certified for movement outside of the quarantined area.

CONTROL OPERATIONS

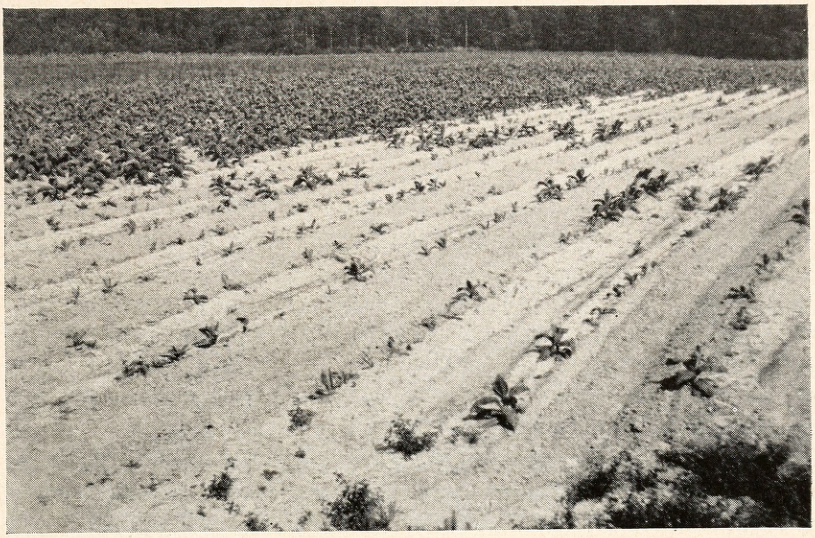
During both 1944 and 1945 extensive control measures have been applied. Insecticides, herbicides and fumigants, have all been used as the case required. In 1944 a total of 8,273 acres and in 1945 a total of 5,004 acres were treated by one method or another. The purpose of these control operations is to reduce the beetle population and thereby lessen the danger of spread of the insect. During the 1944 and 1945 seasons the principal insecticide used was cryolite, but the new insecticide DDT, which became available for commercial use, is being used in 1946. DDT has proven much more effective and economical for controlling white-fringed beetles.

INSPECTION

During the past two years inspections both in known infested counties and in counties not known to be infested have been carried out. Several isolated infestations were discovered during the 1945 season. These were located principally along railroads. Inspections during the first half of 1946 have disclosed no new infestations outside the known infested counties.

QUARANTINE ENFORCEMENT

Many items are covered by the Federal and State white-fringed beetle quarantines. Much time and effort are required for their enforcement. In 1944 over 1,000 special permits were issued, 75 interceptions made, over five million plants barerooted and there were 49 Dealer-Carrier and State Licenses in operation. In 1945 over 3,000 certificates were issued, 18 intercep-



Damage caused by White Fringed Beetles to tobacco on a Pender County farm.

Damage to lettuce by White Fringed Beetles is shown in this photo taken on the E. B. Howard property, Wilmington.

tions made, over 300,000 plants barerooted, 51 Dealer-Carrier and State Licenses in operation and approximately 17,000 square feet of soil surface area fumigated. At the end of 1945 there were 10 certified barricaded units in operation.

A mobile fumigation unit is used extensively for the treatment of such articles as nursery stock, peanuts, cotton and hay so that these materials may be certified for movement outside of quarantined area.

NARCISSUS BULB INSPECTION

J. A. Harris and Dr. D. L. Wray have carried out this exacting work, which is of immense value in protecting bulb growers from serious nematode infestation.

In 1945 a total of 72.5 acres of bulbs on 10 properties were inspected. Four properties including four varieties were found to be infested by nematode.

In 1946 a total of 95 acres on 11 properties were inspected. Only one property was found infested.

There were 154 acres on 11 properties inspected in 1947. Four of these were infested and given the hot water treatment.

During 1948, 120.5 acres on 12 properties were inspected. Four properties were found infested. All infested bulbs were given the hot water treatment.

Narcissus shipping tags were issued to cover each shipment.

EUROPEAN CORN BORER

Counties known to be previously infested are: Camden, Chowan, Currituck, Hyde, Pasquotank, Perquimans, Tyrrell and Washington counties.

Due to some unexplained reason there was a marked decrease in the numbers of borers per plant in the following three counties surveyed: Camden, Currituck and Pasquotank. The average number of borers per 100 plants in 1944 was 392.5. The average number of borers per 100 plants in 1945 was only 35.

In 1944 Bertie, Carteret and Pamlico counties were found to be infested.

In 1945 Dare, Gates and Hertford counties were found to be infested.

No additional counties were found infested during 1946 and 1947.

BLISTER RUST CONTROL

Those who desire information in regard to the cooperative Blister Rust Control program in North Carolina should refer to the annual reports of this office, which is located in Asheville, N. C. The auditor's report will show the expenditures in connection with the Blister Rust project.

INSECT COLLECTION AND SURVEY PROJECT

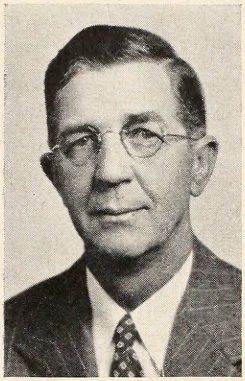
The Division of Entomology recently suffered an irreparable loss. Dr. C. S. Brimley, a member of the staff since 1919, and an eminent authority in the field of taxonomic entomology, died during the summer of 1946. Dr. D. L. Wray has taken charge of the taxonomic work and the collection, and makes the following report:

During the 1946-48 period the North Carolina Insect Collection has grown considerably, thousands of specimens being added from all parts of the State. Many new species of insects have been discovered and described by various entomologists. The insect list has grown to such an extent in the past six years that a second Supplement is merited. Many entomologists within the U. S., Canada and Mexico, as well as from European countries have referred to the State's Insect Collection, borrowed and exchanged material. The Insect List now includes approximately 12,000 different kinds of insects and near insects that occur within the State. This should be materially increased when the next list is compiled.

As a part of the Insect Survey Project, insect identification is one phase of service. Many hundreds of insect specimens have been received and identified for people from all over the State. The majority of these were those insects affecting man and animals, and household insects. The North Carolina Insect Collection is one of the most valuable and the largest of any in the South. It has been built up for over 60 years by the untiring efforts of many entomologists. In order to maintain its monetary investment and material value efficiently it requires more attention.

REGISTRATION OF ECONOMIC POISONS

The Division of Entomology is responsible for the registration of items under the North Carolina Insecticide, Fungicide and Rodenticide Act of 1947. This responsibility was assumed on January 1, 1948. During the six-month period from January 1, 1948, to June 30, 1948, approximately 1,200 products from 247 companies were registered. The label of each item must show the percentage of every active ingredient together with the total inert material. Other statements on the label and in descriptive circulars must be acceptable before registration can be completed. The Division of Chemistry has charge of all sampling and analyses under this law.



R. B. ETHERIDGE

DIVISION OF MARKETS

RANDAL B. ETHERIDGE

More and more this Division is being looked upon as a service division by the farmers, handlers, distributors and others engaged in the various functions of marketing farm products. We have endeavored to be of assistance to individuals, firms and corporations in any or all phases of their activities and to help them in any way possible to protect or improve the economic status of the farmers.

There was a tremendous increase in the production of many farm commodities during the war period, and it remains to be seen whether we can adjust the production to meet a normal or even an increased demand in time to prevent distressful situations.

The producers of all farm commodities experienced a seller's market and received relatively high prices during recent years. We are rapidly approaching a reversal, and it is only a matter of time before we will be in a buyer's market with subsequently lower prices, generally speaking. A production in excess of marketing requirements appeared during the past three years in a few commodities, resulting in demoralized situations; in one, chaotic conditions prevailed.

To prevent recurrences of these conditions as far as is practicable, and to protect the investment of the farmers growing those commodities and all work relating to production, it is imperative that greater consideration be given to service work in connection with the preparation for market, processing, packaging, handling, storing, transporting, distributing, and marketing of agricultural products.

A summary of our activities in the various phases covered by this Division follows.

FRUITS AND VEGETABLES

Record production of fruits and vegetables presented the Division with greater and more diversified problems and opportunities in marketing services, regulatory, and inspection work than at any time during its existence. Shortages of manpower,

materials, and equipment further complicated normal marketing activities. However, considerable progress was shown as some new facilities were constructed; others were started; and definite plans were made for unprecedented developments.

Merchandising of fruits and vegetables was revolutionized during recent years. New methods of packaging, processing, refrigeration, and distribution outmoded many previous practices, necessitating endless efforts by our specialists to keep growers and shippers intelligently informed in order to enable them to maintain their rightful position in the markets. To accomplish

Sweet potatoes properly graded and packed for market.

this, specialists traveled to competing shipping sections and terminal markets serving this State to observe new and modern types of machinery used, the most modern methods of packing and distribution, and new types of marketing facilities.

As a result of this, eight new and modern washing, grading, and waxing machines for sweet potatoes were installed. Also, seven sweet potato dehydration plants were installed and used for diverting many tons of inferior grades of potatoes into a high grade livestock feed, thus furnishing producers a market for a portion of the crop which normally was wasted and aiding in supplementing the livestock feed demands. This was a new

product and it was somewhat difficult to find a ready market; however, a specialist contacted numerous prospective buyers and was successful in selling the product which is becoming increasingly popular with livestock producers and feed manufacturers. Over 500 tons were manufactured from the 1947 crop at a value of approximately $40,000. Eight new power graders were installed in Western North Carolina, five for apples and three for white potatoes; a new sweet potato and apple storage and packing house was erected at Newton; three modern white potato washing machines were installed in Eastern North Carolina; and plans are in progress for installing additional washers.

Plans were made and are underway to develop the sweet potato industry in North Carolina. Numerous meetings were held with growers in all commercial producing sections to discuss and demonstrate improved and modern grading, packing, and marketing practices. Practically all available certified seed stock produced from the 1944 crop was purchased and distributed to growers in the State; approximately 4,000 bushels were handled at cost to the farmers. One of the specialists was sent to Louisiana in February, 1948, at the request of producers and handlers to purchase additional certified seed stock to supplement the local supply; 2,500 bushels were purchased and distributed in 11 commercial sweet potato producing counties.

Representatives marketed, directly or indirectly, over 500,000 bushels of sweet potatoes; they visited wholesale and retail outlets and were instrumental in getting more North Carolina potatoes sold in retail stores where many of the retailers had previously sold potatoes from other states. In cooperation with producers and handlers, specialists worked out plans for a new method of marketing sweet potatoes by inaugurating an auction market at Tabor City. This proved highly satisfactory for both growers and handlers; a noticeable improvement was evident in grade and pack of this product. Plans have been made to open a similar market at Clinton to serve the producers in that section. Additional storing and curing facilities were constructed, and others are in process of construction for sweet potatoes. During the bienniums specialists devoted considerable time to the development of this important crop and the results have been encouraging. Perhaps more improvement has been made during this period than during all previous years.

Division representatives assisted Federal agencies in the movement of white potatoes under the Purchase and Support

Price Program, acting as agents in checkloading, sealing, and billing of cars. This greatly expedited the movement of the crop.

Specialists served as members of the State Potato Committee. This committee made plans for surplus removal, was the official contact with Washington, set up local and area potato committees, aided in setting up purchase offices, and allotted cars when necessary. When the Federal Government was unable to purchase potatoes in cars due to a lack of outlets, specialists inspected temporary storages, stock piles, and even assisted growers in determining the grades of potatoes in unharvested fields.

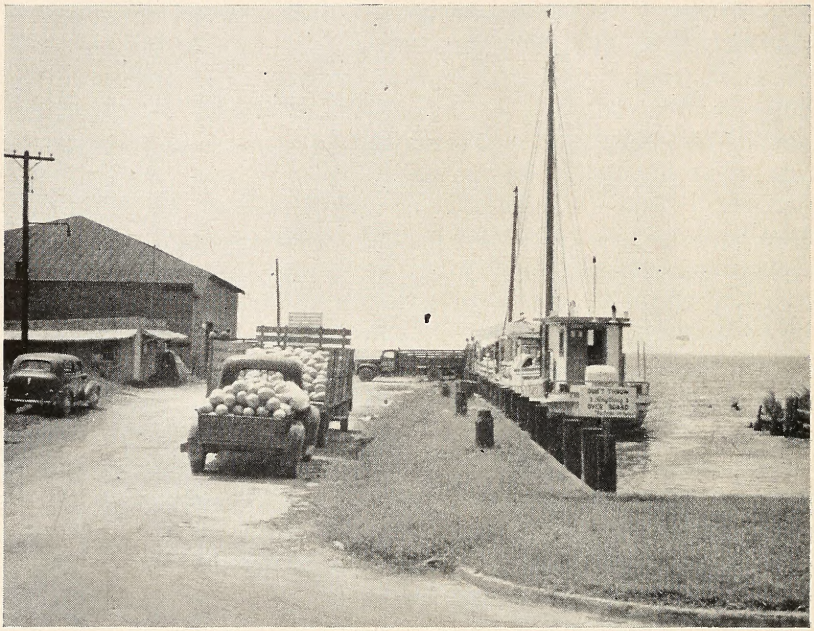
For some time the possibilities of fruit and vegetable expansion in Western North Carolina and the factors which hindered the development of the industry in that section have been recognized. A field office was located at Asheville to serve producers and shippers of that area. This office has demonstrated its value.

Specialists assisted in the successful operation of the produce markets of Hendersonville, Boone, West Jefferson, Spruce Pine, Mount Olive, Clinton, Faison, Wallace, Chadbourn and Tabor City; and the Whiteville pecan market.

Representatives joined producers and handlers of strawberries, watermelons, Irish potatoes, and snap beans at hearings with O.P.A. officials and presented testimony which was in part responsible for preventing a roll back of strawberry prices from $7.99 to $5.25 per crate; watermelons from $35.00 per ton to $21.00; and caused snap bean ceilings to be increased during the period of July 10 to November 1, 1945.

Under the Handlers Act of 1941, handlers were required to establish satisfactory financial responsibility. Out-of-state firms without real assets in North Carolina were placed under bond sufficient to cover their financial liability to North Carolina farmers. Specialists were assigned seasonally to examine grower-handler contracts and to check on compliance.

During the 1947 season a specialist, in making checks on cucumber buying and grading stations, discovered discrepancies and lax practices. He noted that many grading machines were from 1/16 to ¼ inch off contract specifications, due largely to the failure of handlers to keep the sizing machines cleaned. One handler during a short period refused to accept No. 3 cucumbers and paid No. 3 price for No. 2's. Our specialist checked the handler's books and instructed the handler to pay the farmer



Watermelons being shipped by boat from Edenton.

according to contract, which was done. During the 1948 season from two to four specialists were assigned to checking cucumber grading stations, and they found that the screens were not being kept clean of adhering wax and, also, that they were not adjusted properly, which resulted in improper sizing. However, this

Harvesting Irish potatoes in Eastern North Carolina.

latter fact was not entirely the fault of the handlers as they had not been informed by the company selling the screens as to the adjustments which were necessary. This condition was corrected to a very large extent.

In past years, a large part of the Irish potatoes and sweet potatoes and parts thereof received from outside sources for propagation were of inferior quality. In 1947, a bill was prepared, presented to the General Assembly, and passed requiring that only certified potato seed could be sold in the State for propagation purposes, and that such seed stock must conform to standards set up by the State Board of Agriculture and standards fixed by the International Crop Improvement Association.. Enforcement of the Act was carried on by members of the Division. When Irish potato seed stock began to arrive in the State, many lots were found which failed to meet the requirements of the Act; these lots were either diverted to table stock use, diverted to other states, or regraded to meet the necessary requirements. As a result, growers were able to secure better quality seed potatoes, which perhaps was in part responsible for the high yields produced during the 1948 season.

For many years the lettuce growers of Pender and New Hanover Counties have experienced difficulty at times during the harvest season in marketing the crop. At times growers had to plow under their lettuce because there was no market available, while at the same time North Carolina wholesalers and retailers were bringing in lettuce from other producing states. The large chain store buyers and independent wholesalers were contacted for information as to why this condition existed. The answer in all cases was that North Carolina lettuce was not uniform as to grade, size, and pack; and that they could not depend on a constant source of supply. Representatives of this Division met with lettuce producers and handlers and discussed the problem. While progress was somewhat slow, a gradual improvement was noted, particularly with reference to increased and improved packing facilities, washing, pre-cooling, and icing this highly perishable produce before shipment. Specialists recommended to lettuce growers that they establish f.o.b. markets rather than follow the practice of shipping on consignment.

Representatives spent considerable time in the Laurinburg and Ridgeway cantaloupe sections assisting growers in proper methods of harvesting and packing cantaloupes. One of the main problems was that immature melons were harvested. Producers

Sandhill peaches

and handlers showed much interest in improving the quality and are considering legislation to prevent the shipment of immature cantaloupes.

Division personnel participated in a series of meetings with Irish potato and peach growers and handlers relative to marketing agreements. At the meetings, growers and handlers went on record to request the Production and Marketing Administration, USDA, to hold public hearings to receive testimony by producers and handlers as to whether such agreements would benefit those industries.

Potato hearings were conducted at centrally located points in North Carolina, South Carolina and Virginia. Testimony offered by the North Carolina and Virginia groups was favorable. Testimony by South Carolina producers and dealers was unfavorable, and the proposed Marketing Agreement was confined to North Carolina and Virginia. Representatives attended these meetings and testified as to the normal marketing conditions during the harvest season, showing trends in acreage and prices. The Secretary of Agriculture approved the proposed agreement and arranged for a referendum to be held. Prior to the voting, specialists attended a series of producer-handler meetings and explained the purpose and operations of such an agreement. The potato growers of North Carolina and Virginia voted in favor of the Marketing Agreement which was approved by the Secretary of Agriculture who issued an order making the agreement effective for North Carolina and Virginia during the 1948 season.

Specialists met with representatives of the peach industry of North Carolina and South Carolina, and it was decided to request the Secretary of Agriculture to hold public hearings to receive testimony of peach producers and handlers regarding a proposed Peach Marketing Agreement. Representatives of the Division testified at the hearings and gave pertinent information regarding normal market conditions; prior to the referendum, they met with producers and dealers and explained the workings of the proposed agreement. The referendum was held but failed to carry the required two-thirds vote in favor of the agreement, and, therefore, it did not become effective.

One representative joined a group of Irish potato growers and handlers at a meeting with PMA officials and members of Congress in Washington, D. C., in 1947 relative to increasing the 1948 potato acreage allotments in North Carolina. The meet-

ing resulted in the State's getting an increase of 4,000 acres over the proposed PMA allotment.

In addition to the regular marketing work on Irish potatoes a special service was given to potato growers and shippers during the potato harvest season. A temporary office was opened at Washington, N. C., during the marketing period with a marketing specialist assigned to the office to give full time assistance. Daily information as to price, movement from competing areas, the federal support program, and other factors affecting the marketing of the crop was given to growers and shippers each morning by wire and telephone. This information enabled them to know the market conditions at various terminal markets and what price to expect for their product. By making these facts available to growers and shippers, more orderly movement and uniform prices were obtained.

During the winter of 1946, specialists attended a series of meetings sponsored by the Department of Conservation and Development. They gave talks on various phases of marketing opportunities and needs. Particular emphasis was placed on fruit and vegetable processing, pointing out a number of products which are normally in good demand and which can be successfully produced in the State. As a result, several hundred copies of a brief entitled "Opportunities for Fruit and Vegetable Processing in North Carolina" were prepared and distributed to interested persons throughout North Carolina by the Department of Conservation and Development under the name of one of the specialists. They also furnished information to a number of persons in the State who were interested in processing jams, jellies, pickles, preserves and relishes, and furnished information to individuals and firms outside the State who are considering locating processing plants in North Carolina.

The Division cooperated with other state and federal agencies in various phases of the fruit and vegetable industry. In cooperation with the Processed Foods Division of PMA, samples from many carloads of canned fish, pickles, relishes, and other processed products were drawn and sent to the processed foods laboratory for grading. This resulted in processors getting their products inspected more promptly and more economically than if it had been necessary for the Processed Foods Division to send a representative to the State to collect the samples.

A series of conferences were attended by marketing specialists who, in cooperation with representatives of the Extension Service

and Experiment Station, developed an integrated program for the major farm commodities.

Considerable effort was made by specialists to improve the pack of strawberries. They gave demonstrations to growers and radio talks regarding the proper grading and packing of this commodity. The practice of facing or "plating" the top layer of berries in cups throughout the crate was encouraged. Many growers realized approximately $1.50 more per crate by following this packing method.

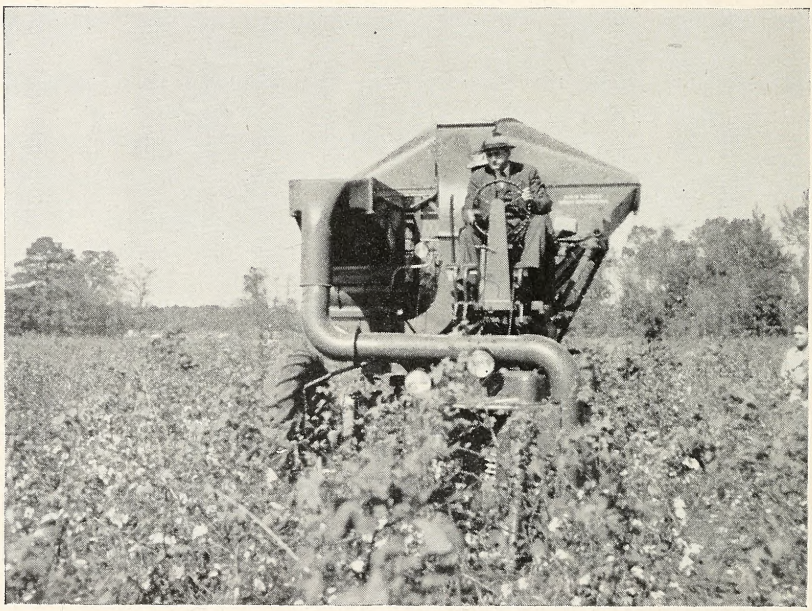
Marketing pecans at Whiteville.

An inspection office was maintained at Williamston to serve the peanut growers, shellers and cleaners in the peanut sections. Much of this crop was purchased by the Commodity Credit Corporation which required inspection.

During the biennium 1944-46, specialists, licensed by the Secretary of Agriculture, inspected and certified as to grade 10,320,488 packages of fruits, vegetables and nuts, the equivalent of 28,791 carlots. During the 1946-48 period, 12,813,505 packages of fruits, vegetables and nuts were inspected, an increase of slightly over 2,000,000 packages over the previous biennium. This was a record high for the service. During the peak movement a total of 170 inspectors were employed for this phase of the work which was requested by producers and handlers. The

principal commodities inspected were white potatoes, sweet potatoes, string beans, green corn, peppers, cucumbers, peanuts, and miscellaneous products.

Our receiving market inspection work, which is a service to the produce receivers in the State, was continued. A total of 177 cars of incoming produce were inspected during the 1944-46 biennium; and, during the 1946-48 period, 328 cars of various produce were certified which was nearly double the previous biennium. This service, no doubt, saved the receivers of North



Commissioner Scott operates a mechanical cotton picker.

Carolina a considerable sum by enabling them to make fair and prompt adjustments, based on an impartial and official inspection.

COTTON

North Carolina has definite advantages as a cotton growing state. In more than half our counties cotton fits naturally into balanced farming. The State's yield per acre is above the national average and is on a par with many of the so-called favored areas. As for the use of machinery, farmers all over the State are demonstrating that mechanization of production even in its present stage of development is practical on most North Carolina farms. In marketing, the North Carolina cotton

grower has a definite advantage in that a large percentage of the raw cotton consuming industry is located in the State. One unique advantage is the ease with which the activities of the several State agencies and interested organizations are coordinated and directed toward the adaptation of production to initial processing and market demands.

Our cotton program was begun July 1, 1945, with the employment of one combination ginning and marketing specialist. Initial activities were limited to investigation of what was needed and demonstration of technical and promotional services which should be rendered. This general survey of the raw cotton industry in the State revealed that the chief handicaps to an advanced cotton program are outmoded business customs within the ginning industry and the average cotton producer's failure to understand that North Carolina cotton is especially hard to gin, owing to early maturity and unfavorable weather conditions at harvest time.

Since we had no authority for fixing and enforcing compliance with standards of gin service, the approach to better service had to be through personal contact, technical and engineering advice to individual ginners, and over-all promotional activities on behalf of cotton. We followed the policy of integrating, so far as possible, our activities with the programs of other State agencies and the several raw cotton interest organizations in the State. For instance, in January, 1946, our ginning and marketing specialist cooperated with representatives of the National Cotton Council of America, the Carolinas Ginners Association, and the North Carolina Extension Service, in planning and holding a series of 24 farmer-ginner meetings in leading cotton producing counties, reaching approximately 4,000 people who derived all or part of their livelihood from cotton. The subject matter presented at those meetings dealt with the interdependent phases of production, initial processing, marketing, and consumption of cotton and cottonseed.

Unquestionably, this promotional effort had something to do with the unprecedented improvement of gin facilities in the past two years. In 1947 North Carolina ginners spent for major improvements (costing $10,000 or more) more than $1.00 per bale for each bale produced in the State. This class of investments increased 100 per cent in 1948. During these two years we were consulted in the selection of more than $600,000 worth of new gin machinery. That investment in new machinery was

indicative of the industry's effort to adapt gin service to new production and harvesting practices.

The immediate objectives of our cotton work were to eliminate so far as possible a number of serious and avoidable losses in the production, ginning, marketing, and spinning of cotton fiber —losses which eventually were channeled back to the cotton farmer. On the basis of government classing records it is estimated that cotton growers in North Carolina lost from a quarter to a half million dollars annually because of "rough prep" (subnormal ginning). The ancient custom of paying part of the gin processing fees in the form of seed marketing commissions accounted for perhaps another half-million-dollar loss to our cotton growers. There is no way to estimate it, but failure to obtain grade and staple premiums with the initial marketing of cotton fiber probably amounted to more than all other losses combined.

Near the close of the 1946-48 biennium we employed two additional marketing specialists qualified to assist with the program of technical service to ginners and field work in connection with the initial marketing of cotton and cotton seed. Their immediate assignment was to inspect and inventory gin equipment. The bases for mechanical inspection are the specifications developed by government research on ginning and recommended by the Extension Service.

Since the problem of rough prep was so serious and the work was begun so late in the season, this year's pre-ginning inspection of equipment was limited to the machines effecting preparation. However, gin owners were informed that the mechanical inspection was part of a program which included checking on the competency of gin employees, the adequacy of cleaning and conditioning elements in the outfit, and the pre-ginning condition of seed cotton as it came to the gin. During the last few weeks covered by this report our specialists were inspecting an average of 10 gin plants per day.

The ultimate goal of our program is the control of the ginning factor in cotton grades. Standardized, controlled, or guaranteed ginning should eliminate many of the handicaps to better marketing at producer levels; and expedite handling of cotton in trade channels on a "one time" classing basis with certification of variety, year of growth, and fiber qualities.

Our activities are predicated on the ginner's relationship to other raw cotton interests, particularly producers, seed crushers,

and retail cotton buyers. Fundamentally, ginning is a production operation which has been transferred from the farm to the custom gin mainly for technical and economic reasons. Historically, the ginner is a community leader and, even under existing conditions, wields tremendous influence on production practices and marketing customs in his community. Practically all State agencies working with cotton agree that the success or failure of any cotton program depends on the cotton ginner. The ginner is the key man in the raw cotton industry.

TOBACCO

Specialists aided tobacco growers, warehousemen, dealers, and processors in every way possible in the various functions of marketing their tobacco.

At the time of the 1944 planting season, blue mold threatened to reduce plantings by one-half in certain areas. By helping growers secure plants from other sections members of the Division were instrumental in bringing thousands of dollars of income to farmers of the State. During the 1944 marketing season a serious labor shortage on various markets resulted in the clogging of outlets and disrupting of markets. Assistance was given warehousemen in securing German prisoners-of-war for the removal of tobacco from the sales floors.

Officials of the Export-Import Bank were contacted, at the request of independent tobacco dealers, for the purpose of aiding dealers in the use of the Bank in regaining and expanding our foreign markets.

The Department is charged by law with the responsibility of compiling and distributing monthly reports on tobacco warehouse sales in the State. These reports are considered the basis for all statistical information as to prices and poundage handled by each warehouse. They were distributed to a mailing list of 1,000, including members of the trade, the press, radio, civic organizations, and others. Statistical information was furnished Fayetteville, Raeford, Lillington, Pinetops, New Bern, and Windsor as to the amount of tobacco raised in their respective areas.

Information and assistance was furnished to growers and others in areas where they felt their marketing facilities were inadequate to meet their needs. Such areas as Wendell, Wilson, Smithfield, Fuquay-Varina, West Jefferson and Dunn were furnished with statistical information and briefs on production and facilities in their respective counties.

Following the auctioneer.

Representatives of the Division and representatives of the Tobacco Branch of the Production and Marketing Administration, with which we have a cooperative agreement, held during the 1944-1946 biennium 44 farm grading demonstrations in the burley area of Western North Carolina, with 682 farmers attending. Fourteen grading and preparation-for-market demonstrations were held in the flue-cured areas of Eastern North Carolina. The meetings were arranged by the tobacco specialist of the State Extension Service. Instruction was given to 5,775 vocational agriculture students in regular classes at 33 vocational schools. During the 1946-1948 biennium 24 cooperative farm grading demonstrations were held with veterans' classes and other growers. Assistance to growers was given principally through demonstrations in the use of U. S. Standard Grades, and in connection with the Stabilization Program, whereby the price of various grades was supported at 90 per cent of parity. Basket packing demonstrations were held in warehouses in Asheville and Boone.

Much work was done in the Burley District on the proper handling of tobacco for market, especially on the Boone and West Jefferson markets where the price of tobacco for the past few years was $3.00 to $6.00 per hundred less than other markets in the District.

During the fall of 1945 the North Carolina Tobacco Advisory Council was organized and placed in the Department. The Commissioner of Agriculture was appointed ex-officio chairman of the organization by the Governor, Honorable R. Gregg Cherry. The general purpose of the Council was to sponsor and encourage the continued production of the world's finest tobaccos. It was to deal principally and primarily with the following subjects: (a) research in all its phases as related to the production of tobacco; (b) the improved production of tobaccos through the encouragement of the use of adaptable varieties of certified seed, soil improvement, better methods of fertilization, cultural practices, elimination or retardation of plant diseases and study of entomology as relating to the production of tobacco; (c) improved methods of harvesting, curing, handling, sorting, grading, warehousing, transportation and storage of tobacco; or any phase of marketing, or any services related thereto; (d) improving and increasing the foreign markets for the sale of tobacco; (e) studies of taxation as relating to tobacco and affecting the price received by the farmer for his product, and the consumer in the use of

same; (f) a training program at our schools and colleges to train leadership for all phases of the tobacco program. The council held three official meetings and sponsored an enlarged research, education, and service program for the biennium 1946-1948.

Warehousemen of various markets requested the assistance of the members of the Division in securing materials and permits for buildings. Other requests were received and assistance was

Grading tobacco.

given in connection with statistical information, historical background on the belt lines, and poundage raised in a given area.

Assistance and services were used by processors in connection with the inspection of re-dryed tobacco. During 1947, 1,148 hogsheads were inspected and certified for condition, packing, and storage. During 1948, more than 2,800 hogsheads were inspected and certified for condition. Specialists at the request of agencies representing the Stabilization Program assisted in the sale of more than 1,000 hogsheads of tobacco. These tobaccos were sold to both domestic and foreign companies.

Growers, dealers and manufacturers from time to time requested the assistance of the tobacco specialist in protesting tax increases on tobacco and tobacco products. He appeared before Congressional Committees in protest against O. P. A. ceiling prices on tobacco, tax increases, and differentials in taxes on tobacco, believing these to be against the best interest of the industry as a whole.

GRAIN, SEED AND HAY

Specialists continued their efforts to help producers and distributors improve the marketability of their corn, small grains, soybeans and hay through better handling, storing and marketing practices, and this information was emphasized through the use of bulletins and motion pictures. Processors and distributors were urged to procure modern equipment to prevent deterioration of the grade and quality of the commodity stored.

Forty thousand bushels of corn which were stored in bins with facilities for turning were tested for moisture, which ranged from 15 to 16 percent. Since it is not safe to store corn with more than 14 percent moisture, it is imperative that those storing this commodity and also small grains and soybeans install dryers for the purpose of reducing the moisture when there is an excessive amount present. Drying facilities are badly needed for the farms, elevators, processing plant and other places where such commodities are stored. Modern elevators and dryers are required if the grain is to be stored safely for use over a 12 months period.

Full cooperation was given to Federal agencies responsible for handling commodity loans on farm-stored corn, wheat and soybeans. A representative of the Production and Marketing Administration, USDA, was designated supervisor for the sampling and our specialists made the analyses and determined the grades on these grains for farm loans, as well as those which were sold to the federal government and to the commercial handlers.

Operators of seed cleaning plants were visited and instructed in the preparation of seeds for market so as to improve the quality of the product. Lespedeza seed, particularly, has been steadily improved by better handling and cleaning practices.

The U. S. Department of Agriculture Hay Standards are the official standards for the State of North Carolina. Failure to use the standards by the shippers resulted in a heavy loss to the farmers on the several thousand carloads of hay shipped into the

State. Virtually all hay heretofore has been sold on the basis of a grade equivalent to U. S. No. 1 but in most instances the quality has been materially lower. In an effort to protect the interests of the producers, conferences were arranged with the shippers in one of the largest hay producing states with the view of getting them to sell on the basis of U. S. Standards and official inspection. This they agreed to do, and it will mean a substantial saving to the farmers in the State.

LIVESTOCK

The livestock marketing program grew and expanded during the last four years in all phases of marketing. Many requests for aid came from livestock producers and agricultural groups. These requests for assistance covered the marketing of livestock, as well as locating feeder cattle, dairy cattle, 4-H Club calves, purebred sires, and many other activities associated with the industry.

During the 1944-1946 biennium, war conditions, government regulations and restrictions made it necessary to revise former policies and plans in executing a livestock program. During this period of uncertainty the livestock workers endeavored to stabilize the livestock industry in the State. This was thought the wisest plan to follow, awaiting the time when conditions should become better settled so that basic and more far reaching objectives could be pursued.

To protect the livestock industry already established along safe and conservative lines was considered of greater importance than promotional work under uncertain conditions. This was done by personal contact with farmers and stock-raisers, frequent attendance at all the leading livestock markets, and by timely advice through the press and various market publications and reports. The result of this policy was beneficial inasmuch as there was neither excessive liquidation nor unwise speculation.

Assistance was given in the sales ring in judging and selecting; in auctioneering the sales of baby beef and fat cattle, both purebred and grade; and in giving advice generally throughout the State to beef cattle growers.

During the biennium 1944-1946 the Division published annually a list of approximately 1,500 farmers who had cattle for sale. This was of great value to both buyers and sellers. Also, timely articles were published semi-monthly in the "Agricultural Review".

A brief summary of cattle bought and sold during the shipping season of 1944-1946 follows:

Approximately 800 head of stockers and feeders.
Approximately 200 head of butcher cattle to local butchers.
Approximately 150 head of breeding cattle.
Approximately 500 head of club calves.

In addition to the foregoing, approximately 2,000 head of cattle were handled for farmers in Western North Carolina and distributed from State-owned farms to the farmers in Eastern North Carolina during this period. Probably more cattle were handled indirectly than directly by giving purchasers necessary information in locating and purchasing their cattle direct from the owners.

Those who wished to fatten steers were assisted in purchasing suitable cattle, and many farmers were helped to secure their replacement stock. Eighteen carloads, totaling 660 head, were shipped during the bienniums. These figures do not reflect several hundred stockers and feeders which were moved by truck or those sold at private treaty by farmers to feeder buyers where the sales were negotiated by representatives.

Specialists assisted the North Carolina Hereford Breeders Association in their annual State Purebred Hereford sales during the biennium 1946-1948, including the selection of the cattle for these sales and the management of the 1948 sale. Breeders were very grateful for this service, and a better understanding now exists between the purebred and commercial breeders. Assistance was given the purebred breeders in selling bulls and females at private treaty.

The commercial cattle business was stressed in all sections of the State. Meetings were held and specialists made talks urging the farmers to buy purebred bulls and good grade females with which to start herds. Steers and heifers of a better quality are coming on the market as a result of this service. Farmers are calling on specialists more than ever for help in grading and selling their cattle and for information on market conditions.

In September, 1944, a trial shipment of lambs was made from North Wilkesboro. As a result of that satisfactory arrangement for concentrating and shipping lambs, efforts were put forth to enlarge and cover the livestock shipping yards at that point. The civic clubs of North Wilkesboro raised approximately $1,000 with which a beginning was made. During the 1945 season,

thirty-four decks of lambs were shipped from that point. This proved so satisfactory that the Southern Railway made an appropriation of $2,500. The yards were extended and covered, feed racks and troughs were installed, an office was built, and the lighting system was extended. Including labor and incidentals, this yard represents approximately a $5,000 plant. All are pleased with the results coming from this concentration point and the outlook for it as a marketing center for twelve to fifteen northwestern counties is bright. Growers were paid for their lambs on the day of shipment and lambs were brought from more than 100 miles to be marketed.

At various points throughout the State assistance was given in the grading of 10,986 lambs during the 1944-1946 biennium. In the eastern section specialists helped with the grading; in the western section regular lamb graders were furnished.

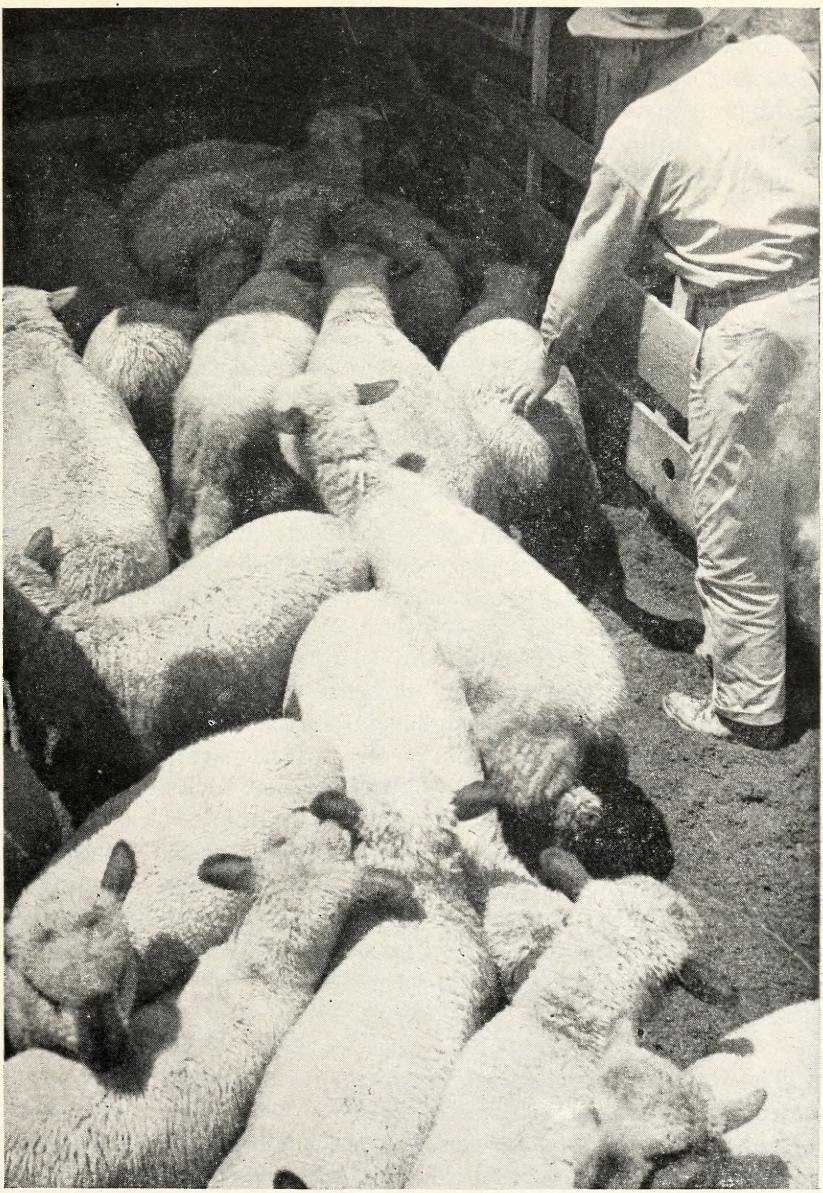
The cooperative lamb pools increased in number; and during the 1947 shipping season, 6,946 lambs were graded by specialists at West Jefferson, North Wilkesboro, Burlington, Tarboro, Swan Quarter, Williamston and Plymouth. All of the lambs were sold by specialists except those from North Wilkesboro. To date, during the 1948 shipping season, 2,646 lambs and sheep have been graded and sold through cooperative shipments. Prices have been good, top lambs selling in the early season for 31 cents per pound at car door. Lambs have improved greatly in quality due to the better quality of rams used.

During 1945, approximately 70,000 pounds of wool were marketed through 40 FCX stores and warehouses. The wool was assembled first at the local stores and warehouses; was later concentrated at Clayton and Statesville, graded by an independent grader, bagged in regulation wool bags according to grade, then shipped to Boston for sale. An initial payment of 38 cents was made to growers at the stores and warehouses; and an additional payment of approximately 12 cents per pound was made at the close of the season for clear wool, lower grades in proportion.

In cooperation with vocational agriculture teachers, a statewide program was inaugurated with war veterans wishing to grow livestock. Numerous meetings were held with the state and district supervisors and contacts were made with the county groups. Every effort was put forth to fill the requirements through the use of the Department's Revolving Fund and by direct local purchases. Due to the scarcity and high prices of

animals the veterans were advised to purchase direct when possible.

The breeding ewe replacement program was continued. Due to the scarcity of sheep, however, more stress was placed on



Grading lambs in Western North Carolina.

saving our native breeding ewes for future use. The national sheep situation has been so critical that this was necessary.

Purchases of dairy cattle were made through the use of the Department's Revolving Fund by the Tennessee Coal and Iron Company's representative. Ninety-three Guernsey cattle valued at $9,300 were purchased and distributed from Raleigh and Goldsboro. One hundred and thirty-nine Holsteins, valued at $27,841, were distributed from Raleigh, Lumberton and High Point. One hundred and fifty-nine Jerseys, valued at $8,745, were distributed from Rocky Mount, Clinton, Goldsboro and Cofield.

Specialists assisted in the establishment of seven additional daily cash hog buying stations during the last biennium. Day-to-day contacts with these and other daily buying stations assured the majority of the State's hog producers a nearby stabilized market. Representatives gave direct assistance in securing outlets, informed the handlers with reference to grading and transportation, and assisted in other matters in connection with their operations.

The second largest meat packer in the United States set up a livestock purchasing program in the State during the last biennium. This was done at the request of members who assisted in working out details of organization and in providing contacts. This company purchased more than $100,000 worth of livestock monthly in North Carolina and plans to expand in the near future. Managers of 14 daily cash hog buying stations were in direct day-to-day contact with specialists for marketing information and advice. In addition, several small packing plants and auction markets requested and received assistance in procuring livestock or finding markets for surplus purchases.

Valuable assistance was given in securing an operator for Kinston's new half million dollar packing plant, the State's only plant eligible for Federal inspection. Members worked closely with the operator of the plant in setting up a regular daily market for the purchase of livestock.

DAIRY PRODUCTS

The dairy marketing activities during the biennium 1944-46 were many and varied due in part to the war and also to its cessation. Not only were we concerned with informing the public of the food value of dairy products and urging that they be used wisely to prevent waste, but we also tried to explain federal regu-

lations and shortages. During the 1946-1948 biennium, particular stress was placed on helping the food budget, in the face of high prices, by including adequate amounts of dairy products. Penny for penny milk gives more for the money than any other one food.

Twenty thousand copies of the dairy recipe book, "Favorite Recipes of North Carolina", which was compiled by the dairy marketing specialist, were received early in 1945. For the first nine months individual requests for these were handled by this Division, with the bulk orders being distributed by the Publications Division. These books had a wide distribution with requests coming from practically every state and from several foreign countries. The supply was exhausted by the early part of 1946, and a reorder was placed for 20,000 additional copies. The distribution of these books has been turned over entirely to the Publications Division.

The informational program is one of the most important phases of the dairy marketing work and is carried out through direct contacts with schools, colleges, and adults. During the 1944-1946 biennium, 228 meetings were held which reached approximately 37,915 people. In the biennium 1946-1948, there were 240 meetings reaching 48,670 people. The majority of these meetings were held with school groups. Other meetings included talks with Parent-Teacher Associations and civic groups, such as Rotary, Kiwanis, Lions, and others. Various means—health education films, talks, rat feeding experiments, displays, and printed materials—were used to tell the story of dairy products. Individual dairies contributed $1,155 during both bienniums which was used for the purchase of educational materials for the schools.

The contacts with students in five colleges in the first biennium were most beneficial and interesting. These future teachers, dietitians, home demonstration agents, and home-makers seemed eager for helpful information. In view of the fact that they will be influencing many students and adults, it is important that they have sound nutrition information. Other colleges were contacted with similar programs during the past two years.

We were fortunate to work with health educators and nutritionists who also were interested in promoting the increased use of dairy products for it gave our program broader coverage. In several instances they were furnished with Dairy Council materials, sponsored by the dairies through funds which were

secured by the dairy marketing specialist. The help of these trained people was invaluable.

Much work was done, and numerous meetings were held, relative to organizing Dairy Council units in Charlotte and Asheville. As yet these have not been established though there is interest in both markets. We expect better results as soon as the dairy situation and prices are somewhat more stable than they have been in the last few years. Much milk is imported since not enough is produced within the State and this situation has been a big handicap to progress.

During the first biennium, frequent food releases were furnished the "Agricultural Review" and seven monthly releases were sent to approximately twenty-five industry publications. Most of these publications were discontinued after the war. Arrangements were made with the State Museum for a permanent exhibit to be placed there by the Dairy Councils of the State.

In both bienniums, many meetings were attended with dairy, home economics, and Parent-Teacher groups in an effort to keep in close contact and to work cooperatively. The dairy marketing specialist served on the State Nutrition Committee, on the Nutrition through Instruction Committee, on the State Parent-Teacher Lunchroom and Health Committees, as a member of the advisory board of the Good Health Association and as an officer of the North Carolina Home Economics Association.

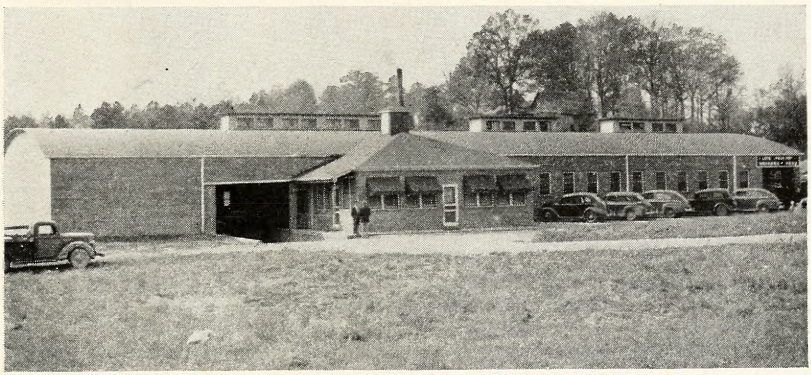
During the past biennium, the different branches of the dairy industry worked jointly to put on an outstanding exhibit at the State Fair. This group also cooperated in sponsoring June Dairy Month. Each year this observance increased in effectiveness. In June, 1948, the dairy marketing specialist mailed two different sets of menus featuring dairy products to approximately 850 members of the North Carolina Restaurant Association.

POULTRY AND EGGS

The poultry industry was in a favorable position, generally speaking, during the bienniums, 1944-1946 and 1946-1948. There was a seasonal overproduction to a small degree, but this is characteristic of the enterprise. Increased consumer demand for better quality and properly graded and packaged products was a testimonial to the increased marketing help given to poultrymen and the industry.

Poultry processing made great progress. The completion of two cold storage plants which worked in conjunction with exist-

ing poultry processing plants helped to relieve temporary surpluses of both poultry and eggs. Fourteen modern plants and numerous smaller plants operated in the State with the majority of the plants specializing in the processing of broilers. Practically all of the plants fully dressed instead of just picking the birds as in former years. A large percentage of the poultry processing plants was given assistance in determining the type of machinery most suited for the particular operation. Two out-of-state trips were made by specialists with plant operators



Modern poultry processing plant.

for the purpose of observing modern plants in operation with the idea of encouraging the installation of the most efficient machinery available. Building plans and recommendations as to the equipment necessary for efficient operation were drawn up for six organizations. Practically all plants were visited several times to discuss the importance of properly processing and grading poultry.

During the late spring and summer of 1945, the United States Government instituted the "Purchase Order" on broilers and fryers, thus making the War Shipping Administration the sole purchaser of broilers and fryers processed in plants at Charlotte, Durham, Greensboro, Monroe, Pinehurst, Raleigh, Robbins, Roxboro, Sanford and High Point. The order came almost overnight and it was necessary to secure and train inspectors for each plant as all poultry had to be certified officially as to grade. The thirteen plants which operated during May, June, July and August under the purchase plan processed 6,200,439 pounds of poultry for the government. The broilers and fryers were New York dressed and shipped to Richmond and New York, ice packed, preparatory to packing and freezing for export.

One plant started packaging cut poultry during the 1946-1948 biennium, under the supervision of the Department of Agriculture, and 250,298 pounds were certified. By this method one bird was packed to a box and hardfrozen. This promises to be a very popular selling item. Several other plants have started this type of marketing, but at present they are not under the Department's supervision.

A Chatham County turkey farm.

In addition to the foregoing, 16,417 pounds of New York dressed poultry were certified by the specialists for Veteran's Hospital, Oteen, North Carolina. This service made possible an outlet for North Carolina chickens during the periods of overproduction, and made prices more stable.

Twenty-two official egg grading stations were operated during the bienniums under the supervision of the North Carolina and United States Departments of Agriculture. These stations were located in Asheville, Champion, Charlotte, Durham, Gastonia, Goldsboro, Greensboro, Hickory, Laurinburg, Raleigh, Wilmington, Wilson and Winston-Salem. The graders at these stations

certified as to grade a total of 321,553 cases of eggs. The turnover in grading personnel was heavy, and much work was done in training replacement supervising inspectors. Three egg-grading schools were held in Raleigh with the cooperation of the Extension Service and State College, with a total attendance of 140 prospective egg graders, managers of egg departments, dealers in eggs, and egg salesmen. Forty-one egg graders were given individual training while the schools were not in operation. Much aid was given to operators of egg grading stations and other egg dealers in planning and remodeling egg grading rooms.

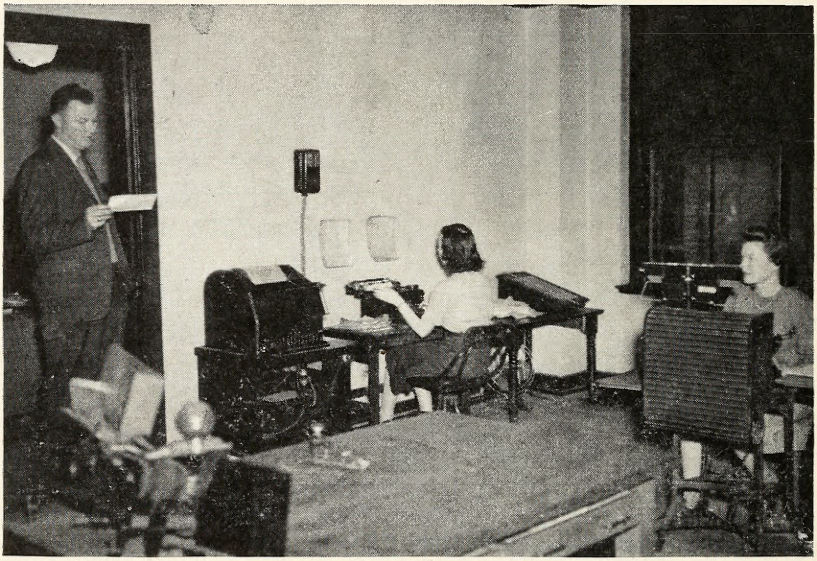
Specialists kept in touch at all times with Quartermaster Market Centers and veteran's hospitals to determine their need for eggs, and this information was relayed to egg suppliers in North Carolina. This helped to relieve some temporary surpluses which had developed during the spring months. In addition, the egg dealers in the State were encouraged and given assistance in processing and storing eggs during the spring months; and details of facilities and equipment for egg breaking and freezing were furnished one egg dealer in the State. Help was given to North Carolina egg dealers during the deficit producing months in locating good quality eggs to replenish local supplies. This, along with our promotional and educational work on quality egg grading and handling, caused consumers to demand a better grade and a properly packaged product, which, in turn, meant a better return to the egg producers.

During the bienniums, specialists, acting for the U. S. Secretary of Agriculture, drew official samples, representing 31,135 cases of evaporated milk packed for overseas shipment, from the plants of two processors. This represented approximately 3,000,000 pounds of whole fluid milk. Also, samples from 1,514,400 pounds of dry milk were taken, representing approximately 18,000,000 pounds of fluid milk which were purchased over a wide area in Western North Carolina. The samples in both instances were sent to Chicago for grade and quality determination.

MARKET NEWS

The removal of O. P. A. controls on farm products during the 1946-1948 biennium caused sharp increases in the demands made by producers and handlers for Market News information. Because of this demand, it was necessary for the first time since the establishment of the service in the State to begin issuing regular daily mimeographed bulletins covering the State's pri-

mary agricultural commodities. In order to do this, a new Addressograph was added to the permanent equipment in the Raleigh office, and total mailings moved about thirty-five hundred units per week. With the establishment of a new 5,000 watt radio station in Raleigh and the request by this station for daily market news information, the number of daily radio scripts prepared by the Raleigh office increased from two to three. The city's two principal radio stations devoted around thirty minutes per day to market information prepared by the Raleigh office. Practically all of the State's radio stations used some informa-



In the Market News Room.

tion prepared by the Market News offices in Raleigh and Asheville and relayed to the stations over the leased wires of Associated and United Press. Raleigh's morning paper used more than 1,500 regular and weekly market reports in addition to the special reports issued by the office.

The Asheville office, which centered its program around Western North Carolina agricultural commodities, prepared two programs which were used daily by Asheville's two leading radio stations. The city's two daily newspapers carried regular reports on the different commodities produced in Western North Carolina and also special releases from time to time.

The Market News Service provided accurate daily news coverage on price, demand, and movement of farm produce at lead-

ing state and national markets. To prepare and distribute this information, the Raleigh and Asheville offices are parts of a system served by more than 8,000 miles of leased wire services which connect offices in the principal cities and temporary marketing points throughout the country. The Service is operated under cooperative agreements between the United States and North Carolina Departments of Agriculture.

Market reports were issued daily covering fruits and vegetables, livestock, poultry, and other farm products. These reports went to the State's leading newspapers over the wires of Associated and United Press. Daily market reports covering North Carolina potatoes, peaches, and watermelons were issued by seasonal branch offices located in Washington and Hamlet. The Raleigh office issued daily tobacco reports, which began with the opening of the sales season on the Border belt and continued through the closing of sales on the Old Belt Markets. The Asheville office issued daily reports covering prices and market conditions on Western North Carolina's burley tobacco markets.

The two offices handled more than 10,000 local and long distance telephone calls yearly. Most of these calls were paid for by producers, dealers, and consumers interested in selling or buying North Carolina agricultural commodities. The Market News Service saved the citizens of the State enough in telephone and telegraph charges alone to more than pay the total cost of operating the two offices.

Adequate market news information is the recognized basis for determining the price, the time to sell, and the market at which to sell agricultural products. Leading newspapermen and radio program directors, in discussing markets and market conditions, point out that this information is demanded by a large percentage of readers and listeners.

TRANSPORTATION

Transportation is an ever increasing cost in the marketing of farm produce. We witnessed several increases in freight rates during the last year which were granted by the Interstate Commerce Commission to the railroads in spite of the protests of the shippers and producers. The railroads claimed that increased labor costs and other items justified them in asking for the increased rates and that the shippers and farmers were able to pay. The present inflationary period with ever increasing transportation charges will work a great hardship on producers and

shippers during the next few years, and more effort than ever will be required to get rates reduced as commodity prices decline.

Specialists attended conferences in several states in the preparation of material for rate cases and appeared with representatives of the State Utilities Commissions and of commodity and farm organizations in Washington, D. C., Columbia, Atlanta, Chicago, and Raleigh in connection with rate matters. It is anticipated that in the future we will be called upon for more and more information in both interstate and intrastate rate cases.

In December, 1947, the Interstate Commerce Commission undertook to reclassify certain farm produce which was prepared for market in accordance with modern methods. The effect of this new ruling, if made applicable to all farm produce, would be to increase the transportation costs and prevent their movement by trucks other than franchise operators; and it would tend to have the effect of forcing shipments by rail which in many instances would restrict distribution. Specialists joined with representatives of the U. S. Department of Agriculture and others in getting the Commission to reopen this case. The first hearing was scheduled for September, 1948.

The Norfolk Southern Railroad Company agreed with handlers and processors on their road in North Carolina to adjust the freight charges on peanut shipments originating in North Carolina as compared with the charges made for peanut shipments originating in Virginia. The Southern Freight Association denied the application. It is anticipated that an appeal will be made to the Interstate Commerce Commission and that hearings on this matter will be initiated.

We were requested to assist handlers who ship oats and corn out of North Carolina to northern points to get a commodity rate. The railroads granted the request for this rate on oats, and it is expected that it will be granted on corn. Prior to this it cost more to ship oats from North Carolina to Pennsylvania than it did to ship them from Pennsylvania to North Carolina. The same situation exists with respect to corn shipped from Eastern North Carolina.

The icing of cars for potatoes was suspended during the War. Upon the request of shippers a hearing was held by the Interstate Commerce Commission in April 1947, and our specialist joined with others in furnishing information which resulted in the Commission's ordering the service restored.

Members attended conferences for the purpose of expediting the time of delivery of fruits and vegetables to eastern and northern markets. It is believed that with a fully coordinated effort on the part of producers, shippers, and the carriers second morning delivery can be made. Third morning delivery is now the case in most instances.

In most rate matters our efforts are coordinated with the Traffic Department, State Utilities Commission.

COMMODITY DISTRIBUTION

Food products acquired by the Federal Government and donated to non-profit schools and eligible institutions were distributed by the Division. Distribution of commodities in this State was governed by a cooperative agreement between the U. S. Department of Agriculture and the State Department of Agriculture and also by sub-agreements between the State Department of Agriculture and the county and city superintendents of schools, superintendents of eligible institutions, public welfare and others.

All commodities distributed were purchased by the U. S. Department of Agriculture with funds appropriated by Congress. Two funds were available for this purpose and commodities purchased were commonly referred to by the section of the authorizing statute. The term "Section 32" referred to that part of the AAA Act of 1938 which authorized the use of 30 per cent of import duties by the U. S. Department of Agriculture to support the price of certain farm products at a minimum level. "Section 32" foods were purchased on the basis of "surplus". "Section 6" referred to a section of the National School Lunch Act of 1946 authorizing the use of about one-fourth of the funds appropriated under that Act in the direct purchase of food for distribution to schools participating in the National School Lunch Program. Selection of food to be purchased from "Section 6" funds was based on nutrition and acceptability.

The people of the State benefited in two ways from this program. Not only were prices for agricultural products held at or above levels at which the grower would not suffer severe financial losses, but also the schools and institutions receiving this food were enabled to serve better meals at lower cost. Thus, good food was diverted from rotting in the fields because of low prices, and the food went into school lunches to help improve the health of the children by better nutrition and to supplement the diet of persons served by institutions.

The value of commodities and participation figures for the two bienniums are shown by the following table:

BIENNIUM 1944-1946

	Number	Number Persons Served Daily	WHOLESALE VALUE OF COMMODITIES		
			Section 6	Section 32	Total
Schools	1,321	300,000	*	$ 675,029	$ 675,029
Institutions	59	16,280	.....	**344,927	344,927
Welfare	.....	.....	.....	**	.....
Total	1,380	316,280	.....	$1,019,956	$1,019,956

BIENNIUM 1946-1948

Schools	1,363	321,349	$1,432,128	$1,422,484	$2,854,612
Institutions	96	20,118	.....	389,826	389,826
Welfare	.....	28,648	.....	24,861	24,861
Total	1,459	370,115	$1,432,128	$1,837,171	$3,269,299

*"Section 6" funds were not available until fiscal year 1946-1947.

**Division of Markets did not handle distribution to institutions or welfare prior to March 1, 1947. Figure indicates value of food distributed to institutions by other State agencies during this biennium.

Commodities were sent from many states into North Carolina for distribution. Doubtless just as many states received commodities purchased from growers in North Carolina under price support programs.

Many problems were encountered in trying to get the foods to the schools and institutions located in the 100 counties of the State. The commodities were received in carlot quantities and it was necessary to arrange for transportation from the carlot receiving points to the units involved. In many instances the superintendents sent a truck for their allotment. In many other cases the superintendents had no trucks or for some other reason were unable to arrange transportation, and arrangements were made with motor freight or express companies to make delivery. This involved considerable labeling and consigning of packages.

Each year during the summer months when the schools were closed we accepted and provided storage for commodities offered at that time. As an example, in the summer months of 1947 we stored at the Camp Butner cold storage plant more than 1,400,000 pounds of North Carolina-grown Irish potatoes which were distributed in the winter months. Storage also was provided for foods not requiring cold storage. Use was made of the Depart-

ment's Revolving Fund for paying storage charges, and the Department was reimbursed by the schools when the commodity was delivered to them. Schools and institutions received products valued at many thousands of dollars which they otherwise would not have gotten had we not provided storage when the foods were available.

COOPERATIVES

Aid to cooperatives was continued by the specialists of the Division. During the 1944-1946 biennium, 10 new cooperative purchasing and/or marketing associations were incorporated; and during the 1946-1948 biennium, 53 were incorporated, the majority of them being breeding cooperatives for dairy improvement. Representatives helped many of these associations by explaining the State and Federal laws; by aiding in setting up the organizations, including the preparation of applications for charter; and by assisting in the formulation of by-laws and marketing agreements.

In 1943 a Federal law was enacted requiring certain organizations, including cooperatives, to file annual information reports. As a prerequisite, a cooperative claiming to be tax exempt was required to apply for and receive from the United States Commissioner of Internal Revenue a certificate of exemption. All cooperatives were given assistance in the interpretation and application of these requirements; individual assistance in the filing of the necessary documents was given in some instances.

During 1947, the General Assembly enacted a tax study law which required all cooperative and mutual farmer organizations to file special reports, these reports to be the basis of a tax study and of recommendations to the next Legislature for the purpose of determining whether additional taxes should be collected from cooperative associations. Several organizations were given aid in making these reports.

All cooperative associations were required under State law to file an annual operating and financial report with the Division. These reports were analyzed and constructive suggestions for the future operations of the associations were given by the specialists. In addition to these services, the specialists gave technical advice and assistance to cooperatives with respect to their operating and marketing problems.

MARKETING LEGISLATION

Honorable W. Kerr Scott, former Commissioner of Agriculture who was chairman of the Marketing Committee of the National Association of Commissioners, Directors and Secretaries, assisted by members of the Division, took an active part in promoting national legislation for execution on a state level. From these efforts we can report the two following accomplishments:

First, we participated in several conferences called by the Council of State Governments and Federal Administrative Agencies in cooperation with the Department of Justice. As a result, there has been submitted to all states proposed uniform legislation for (1) inspection certificates, (2) marketing facilities, and (3) Bureau of Markets.

Secondly, after several years of effort led by Commissioner Scott, representing the National Association of Commissioners, we actively and effectively cooperated with others in the passage of the Research and Marketing Act, Public Law 733 of the 79th Congress.

Title I provides for a broad program of research, basic and applied, in the physical, biological, and social sciences. It covers agricultural problems in the broadest sense—production, utilization, marketing and distribution; the improvement of farm and rural life, and the contribution of agriculture to national welfare. It provides for research both in the Department and in the State agricultural experiment stations, with emphasis on cooperation among State and Federal agencies and special provision for work on regional problems.

Title II authorizes a broad and coordinated program in marketing, including research, education and service work. It makes special provision for Federal-State and government-industry cooperation in this work.

Specialists assisted in the preparation of bills relating to marketing which were subsequently introduced and passed by the General Assembly of 1947. They are as follows:

Chapter 467, An Act To Regulate The Sale of Irish Potatoes And Sweet Potatoes And Parts Thereof Offered For the Purpose Of Propagation.

Chapter 511, An Act To Enable Flue-Cured Tobacco Farmers In North Carolina To Hold A Referendum And To Promote

Through Organized Effort The Export Sale of Flue-Cured Tobacco.

Chapter 1018, An Act To Enable Farmers Who Are Producers Of Agricultural Commodities To Act Jointly With Dealers And Processors In Promoting The Sale, Distribution And Consumption of Such North Carolina Farm Products.

MISCELLANEOUS ACTIVITIES

Specialists of the Division had many and varied requests for help and information in addition to their regular duties. They aided in securing scarce items such as building materials, tires, trucks, and sheet iron for tobacco flues; they cooperated with the Federal Departments in locating storage facilities, both dry

An up-to-date freezer locker plant.

and cold, and processing plants of all kinds; they were called on by the Federal and State Post-War Planning Boards for special information; and they attended conferences in Washington, D. C., with reference to marketing bills and post-war activities.

Since the War many farmers have been assisted in securing war-surplus equipment such as decontaminators for spraying orchards, tractors equipped for terracing land, fence posts, and power units. Requests for information on cooperatives and rural industries have increased; block plants and freezer lockers have been promoted; and rural electric service and rural telephone development have been aided and encouraged.

PERSONNEL

Careful selection of personnel of outstanding ability, training, and practical experience has paid dividends to North Carolina agriculture. In addition to performing their regular duties, employees of the Markets Division were called upon to meet many unusual requests and demands which they did with ingenuity and efficiency.

ACKNOWLEDGMENTS

We have enjoyed cooperating with branches of the U. S. Department of Agriculture with which we have operating agreements; with the Extension Service and various departments of State College; and with other Federal and State Agencies. In particular, we should like to express our appreciation for the fine assistance given us from time to time by the county agents and vocational agricultural teachers.

STATE MUSEUM

HARRY T. DAVIS

HARRY T. DAVIS

World War II came to a close early in the second year of the 1944-46 biennium. The Department of Agriculture's Service Flag has been furled. The Museum "conversion" has faced difficulties much as have other human activities. The paramount educational function of the Museum, to present the natural history and natural resources of North Carolina, remains unchanged. The cosmopolitan groups in uniform have given way to other visitors, school age youth predominating, and the Museum program is directed to serving these visitors by working more closely with our established institutions. Reworking old exhibits and installation of new exhibits will be shaped in this direction.

For 1946-48 the Museum continued its efforts for more educational work through and with North Carolina groups. New and improved exhibits have been built towards this end. Chronic inability to secure desired facilities and equipment, at a reasonable cost, if at all, has been a problem.

During the past biennium North Carolina youth groups have responded to our program. For the one year, 1947-48, 312 such visiting groups were recorded. These were in numbers from 20 to 120 and from as far as 200 miles. They came from colleges, primary schools, churches and summer camps. It appears that our printed and mimeographed information supplied to teachers and students enables them to better utilize a visit to the exhibits as a helpful part of their current school work. More than one group has expressed the intent of having the science class re-visit the Museum, following a general visit to Raleigh, to concentrate on our natural science exhibits.

ACCESSIONS

Information and exhibits have accessions as a broad base. One mineral sample, or one bit of biological information, out of scores submitted, may provide a valuable resource, or fact of value to man.

Below is given a summary of accessions for the 1944-46 biennium:

Rocks, minerals and fossils, 123; forestry and botany, 16; invertebrates and insects, 3,449; fishes, 73; reptiles and amphibians, 246; birds, 385; mammals, 178; archaeology, 20; agriculture, 18; handicraft, 6; library volumes, 104; bulletins and pamphlets, 630; pictures and lantern slides, 19, a total of 5,267.

Some significant accessions were: Lava and ash from Vesuvius and Mauna Loa and zeolites and agates from Guam, donated by M. M. Riley and James Lowes, in service. Core samples were collected from the 4,000 foot oil test well near Morehead City.

An excellent collection of some 3,000 mounted insects was given the Museum by Mr. and Mrs. Jackson H. Boyd as a memorial to their son, John H. Boyd, who was killed in service in the South Pacific. Mr. and Mrs. Otto Schuman presented a smaller insect collection to the Museum.

Edward H. Brimley sent us specimens of the famed climbing fishes of New Guinea. W. S. Smith presented a 75 pound Cabio, a record catch for our coast.

A pit viper was sent us from Okinawa by Thomas C. Allen just after invasion landings were made.

Dr. C. T. Wilkinson sent in a bird of paradise from New Guinea and William Craven sent in birds from New Caledonia. Howard Wiswall presented a collection of some 300 bird eggs, some rare, he collected in our area some 40 to 50 years ago. Through William S. Bunn a rare white pelican was added from Nash County.

William Craven contributed a "flying fox", a large bat, from New Caledonia.

A hooded seal, rare for Bogue Banks, came to us through the U. S. Fisheries Laboratory, Beaufort.

Thomas D. Stewart gave the Museum a large stone axe from an American Indian village site near Coats.

Accessions for 1946-48 are summarized as follows:

Rocks, minerals and fossils, 125; botany and forestry, 26; invertebrates and insects, 70; fishes, 56; reptiles and amphibians, 169; birds, 141; mammals, 65; archaeology, 36; agriculture and handicrafts, 55; library volumes, 33; bulletins and pamphlets, 460; pictures and lantern slides, 61, a total of 1,297.

Some significant accessions for the period were:

A series of bird, mammal and reptile skins, and numerous pamphlets and reprints from the personal collection of the late

Dr. C. S. Brimley, veteran Department scientist. These study skins and specimens are being arranged and added to as a *Memorial Collection.* They will be of most use to college and university scientists.

The Standard Oil Company of New Jersey presented cores and other samples of their 10,000 foot well drilled at Cape Hatteras and supplementary samples from their *deep well* in Pamlico Sound, near Manteo. These are research materials that will be of inestimable value when further exploration for petroleum is undertaken along our coast.

Fletcher Pearson of Clinton has presented a series of old farm implements and tools used in our early turpentine industry.

The North Carolina Shipbuilding Company presented an excellent scale model, with a display case, of one of the more modern cargo ships built at Wilmington during World War II.

Richard Dillon Dixon, of Edenton, presented some 60 wild bird eggs that he had collected in eastern North Carolina during his youth.

By execution of his will, the late Rev. William Cobb Lane of Sanford, presented a mounted black squirrel.

A unique mud snake, of a rich red color, was presented by Martin O. Shackleford, from Hertford County.

The Sumner family of Franklinville presented an antique hand-organ, through Miss Laura Sumner.

A mounted Penguin was sent us by Ewart G. Ray, a native of Wake County, from the latest South Polar expedition of the U. S. Navy.

A 58 pound Wahoo, a rare fish visitor from the South, was presented by Dr. E. A. Pearson. It was taken off Cape Fear.

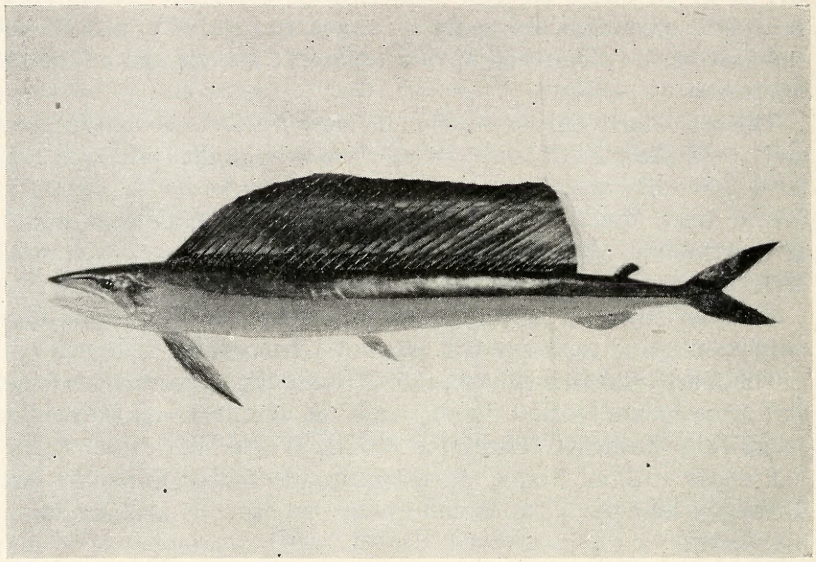
The second recorded lancet fish from our coast was presented to us by Harry Tugwell, from Oregon Inlet.

A purple gallinule was presented by Ellis E. Fleming of Manson. Significantly, this bird was a sexually mature male, May 29, 1948, but the species has not been known to nest in this State.

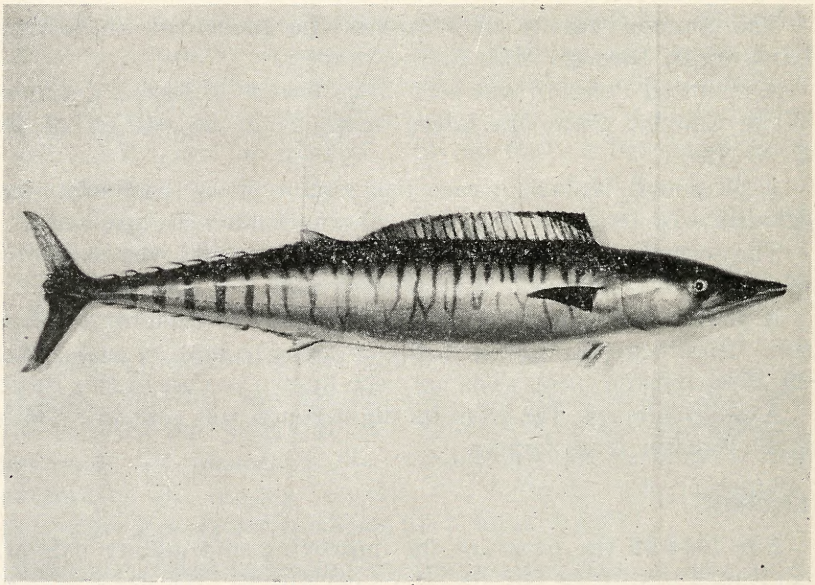
A red phalarope, far from its flight route, was sent in by Mrs. C. S. Warren from Lenoir.

EXHIBITS

For 1944-46 the program for improving and adding exhibits continued insofar as our resources permitted. We were without the services of the third member of our technical staff for a considerable part of the biennium, and this was a handicap.



LANCET FISH—*Alepisaurus*
From Oregon Inlet. Length: 63 Inches.



WAHOO—*Acanthocybium solandri*
Caught off Frying Pan Shoals. Weight: 58 pounds.

In our Entrance Hall an aquarium is used to help observers learn the identity of local fresh-water pond fishes. New exhibits were added showing an alligator swamp group, typical of eastern North Carolina, and some colorful peafowl. New agricultural exhibits deal with dairying, honey production and silk worms. For students of zoology a special Animal Kingdom exhibit is designed to help clarify animal classification and relationships.

With the added services of a taxidermist for most of the 1946-48 biennium more work was done on improving old exhibits and adding new ones. Notably the habitat groups of seals, deer, opossums, marsh birds, and beach birds were greatly improved. We were able to keep a representative collection of our live poisonous snakes and this continues to receive top attention from visitors.

Worthy of record here is that the water moccasin, known as Columbia, died on July 1, 1947, after being exhibited here since May 10, 1934.

The canebrake rattlesnake, known as Pamlico, died on September 9, 1946, weighing ten pounds and six ounces, and 5½ feet long, after being exhibited here since September 5, 1935.

PUBLICATIONS

The last biennial report stated that an illustrated booklet on Poisonous Snakes had been brought out. As of July 1946, 25,000 copies had been distributed and as of July 1948, this distribution has grown to 30,500, of the 50,000 copies that were printed. The nominal charge for these has sufficed to pay the cost of printing and handling. This was necessary because this museum had no appropriation for such purpose.

Anticipating a period when an authoritative work on "Birds of North Carolina" may again be unavailable for our schools and public libraries, we have some 600 copies remaining that we expect to serve this need. This volume has been a financial success and was published without use of State funds. A modest balance is available for use in a similar Museum publication. As of July 1, 1948, some 150 copies are still available for schools and libraries.

This indicates that a similar illustrated volume on the mammals, reptiles and amphibians would meet a like response. With this in view, a preliminary text was prepared and made available by the late Dr. C. S. Brimley, long time scientific worker

with the Department. The Carolina Biological Supply Company has printed these manuscripts, in portions, and the Museum has secured, assembled, and given free to schools and public libraries several hundred pinned and unbound sheets on Mammals of North Carolina.

During the 1946-48 biennium the Museum has continued to collect information on our mammals, and other fauna, and to enlist the assistance of others who are in a position to help. Arrangements have been made to secure good illustrations for a volume and it is hoped that the next report will announce its publication.

For a number of years fossil collections and field studies have been carried on by the Museum in Eastern North Carolina. It is now planned to join forces with the State Geologist to produce a well-illustrated volume on this subject. An objective for this will be to present the geology with non-technical clarity so that it will be both interesting and understandable to layman, teacher, and in high school science, that all may come to know better the basic facts about the origin and character of the lands on which they live.

The practice of issuing mimeographed Information Circulars about North Carolina natural history has been continued. Visitors and written requests have taken a distribution of some 135,000 copies during this biennium. Subjects covered thus far are: Aquaria and Terraria, Bats: Flying Mammals, Making a Bird Skin, North Carolina Gold, North Carolina Gem Stones, Meteorites, Opossums, White-tail or Virginia Deer, Fossil Whales, Mammoth and Mastodon Fossils, Insects and Entomology, Poisonous Plants, Important Honey Plants in North Carolina, Some Common Snakes of North Carolina, Raising of Earthworms, Bird Banding, Bird Feeding Stations, Bird Calendar, Some Common N. C. Birds for November, Some Common Spring and Summer Birds, The Cardinal—Our State Bird, Tanning Snake and other Small Skins, The Black Widow Spider, and Archaeology in North Carolina.

These have been developed through the years to answer more frequent inquiries. As teaching and camp personnel learn of them more are called for. For the 1946-48 biennium an estimated 148,000 have been distributed.

Suggestion has been made that these would be more useful, if printed with illustrations, for the Resource-Use Education program.

ATTENDANCE

For the four years ending July 1, 1948, visitors to the Museum totaled 600,483 based on actual count. Yearly figures are as follows:

1944-45	1945-46	1946-47	1947-48
126,740	146,755	168,040	158,948

There is every reason to anticipate that more and more citizens will seek pleasure, along with information and education, by visiting the Museum. It is not too much to anticipate at least one visit from every grade school pupil to the Capital.

The Museum is kept open on Sundays and holidays, except when mid-winter temperatures make this impractical. This gives a great many more people an opportunity leisurely to visit the exhibits, and the added cost is relatively small per visitor.

COOPERATIVE WORK

For the State Art Society we exhibited the very valuable art collection of Mr. and Mrs. George V. Monk, of Farmville, from January, 1945, to January 1946. We have turned over to the Historical Commission a number of accessions, some relating to World War II, that more properly belong in their field.

For a special exhibition at the Mint Museum, Charlotte, we loaned ten large water-color paintings of native birds. We have maintained exhibits of insects, and on egg grading, tobacco grading, and dairying for various divisions of the Department of Agriculture.

Literature, lantern slides, preserved specimens and other technical material for Wildlife training courses, bird clubs, and school science groups have been made available.

Most notable was a plan initiated by the North Carolina Bird Club to supply natural history material to public school teachers. Some 200 of our teachers took advantage of this offer and the Museum secured and supplied the material and text. The teachers sought aid in teaching elementary science more effectively as it applies to North Carolina. In general, the results were very good, considering the meagre assistance that could be given. This beginning indicates the teaching aids that might be had from travelling school exhibits in a state that is rich in fauna, flora and minerals. This has greatly enriched elementary school work elsewhere and can be had in North Carolina at a relatively small cost.

A typical group of visitors to the State Museum.

The monthly Sunday afternoon programs sponsored at the Museum by the Raleigh Natural History Club ran through the biennium. The Board Room of 200 capacity was usually overcrowded and uncomfortable hazards were created. This indicates the eagerness with which the educational pictures were ceived, but satisfactory results must wait for better auditorium facilities.

Loans for exhibits were made to such agencies as the University of North Carolina, Boy and Girl Scouts, 4-H and F.F.A., Garden Clubs, Game Resources Commission, conservation conferences, sportsmen's shows, the American Museum (New York) and the Universities of Oklahoma, Michigan, Cornell and Houston.

Gifts of surplus materials have been made to the Philadelphia Zoo, Converse College, the State Blind School, Southern Pines School, the Children's Museums of Charlotte and Durham, and others.

The Museum has continued to work closely with the North Carolina Bird Club on conservation and education. The 100 kodachrome slides and 6 slide films (of birds) were kept in circulation to clubs, camps and schools, and an estimated 7,200 persons saw them each year of the last biennium. Arrangements have been made to secure a gift of more kodachromes.

The Museum has continued to work closely with other State agencies and citizens. Many minerals are identified and evaluated; many animal and plant forms are likewise treated. There are such questions as mistletoe culture, bats as insect controls, a native scorpion from Tryon, cave crickets and snakes in homes and, best remembered, a human skull from Granville County that was brought in by a dog and a sheriff, identified and hurried out.

The staff has continued to make illustrated talks to clubs and schools. Hunters and fishermen have been given assistance and advice in taking care of their trophies.

PERSONNEL

H. H. Brimley, veteran curator who did his first Museum work here in 1884, was taken by death on April 4, 1946, after an extended illness. He had devoted his life to building a Museum worthy of his State. Appropriately, the Board of Agriculture has designated the Museum Library as a permanent tribute to his memory.

Mr. Brimley's death left the Museum technical staff without the services of one of the three workers. Difficulty was experienced in filling the vacancy due to a low salary schedule. It has been requested that this situation be remedied in our new budget.

This condition prevailed until Gustaf T. Sundstrom was employed as curator of exhibits, as of July 8, 1947. After doing most effective work here, he was called back to Washington with the Fish and Wildlife Service, with compensation out of our range.

On February 9, 1948, we secured the services of J. W. Johnson, who had finished training at the University of Iowa, and Cranbrook Institute. He is doing valuable work for the Museum.

With provision by the last Legislature for a receptionist and attendant, Mrs. J. Baxter Johnson was employed on July 1, 1947.

The other Museum personnel continue to perform their duties well. All deserve consideration in the salary adjustments in view of living costs.

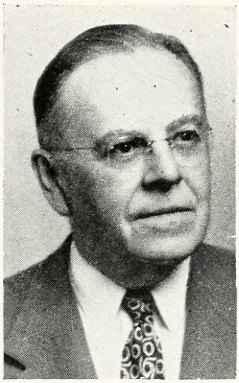
BUILDING

During the 1944-46 biennium, a committee authorized by the State Legislature, under the chairmanship of Hon. U. B. Blalock, gave consideration to buildings in the capital group. The Museum was visited and it was pointed out that the building, about 50 years old, constituted a fire hazard as regards the Museum contents, which have an inventory value of some $175,000, and much of which is irreplacable.

The following biennium recorded no material change in this situation. The needs are only more obvious.

SEED TESTING DIVISION

W. H. DARST



W. H. DARST

There is nothing particularly sensational or dramatic about the operation of the Seed Laboratory or the enforcement of the seed laws of North Carolina. However, since agricultural and truck crops provide approximately 86 per cent of the total cash income from our farms, the welfare of the State and its citizens are greatly affected by the inspection and testing of seeds.

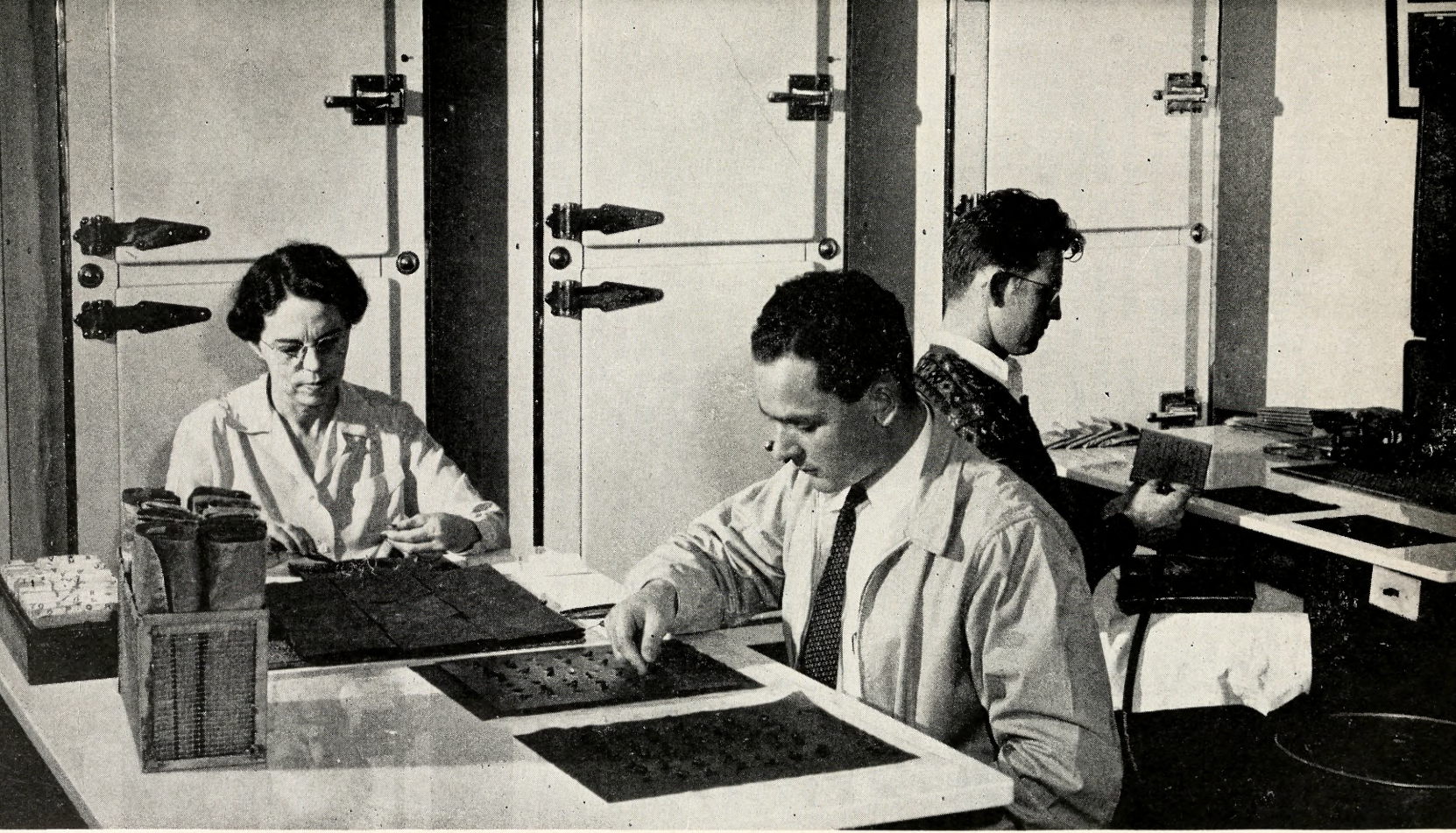
The services rendered by the seed laboratory consist mainly of analyzing and testing inspection samples as an aid to the enforcement of the seed law, and testing seed samples sent to the laboratory by farmers and seedsmen for the purpose of obtaining the analysis necessary for the proper labeling of seed to be sold, or for information as to the quality of seed to be purchased or to be planted.

Other services rendered by the laboratory consist of cooperating with the Federal Seed Control Officials in enforcing the Federal seed law, identifying plants and seeds, advising as to compliance with the Federal and State seed laws. The laboratory also furnishes advice on the cleaning and processing of seeds, and information as to source of supply and demand for seeds, etc.

From July 1, 1944 to June 30, 1946 the seed laboratory analyzed and tested a total of 28,175 samples of seed. Of this number 26,235 were "Service" samples and 1,940 were "Official" samples drawn by seed inspectors from "lots" of seed on sale within the State. From July 1, 1946 to June 30, 1948 a total of 33,084 samples of seed were tested. Of this number, 29,912 were "Service" samples and 3,172 were "Official" samples drawn by seed inspectors.

In carrying out the provisions of the seed law during the four years ending June 30, 1948, 498 "Stop Sale" orders were issued on lots of seed that were found to be on sale in violation of the Seed Law. All of these were held under the "Stop Sale" order until the requirements of the law were met, or the seed removed from sale as such. A number of lots were found to be low-grade and sales were prohibited as provided by law. Of the total num-

A trained seed analyst is able to distinguish all agricultural and vegetable seeds, and in addition the different species of weed seeds occurring in the seed crop.



Different kinds of seeds and stages of maturity require different methods for germination. Certain seeds germinate best on sterile blotters, others on special paper toweling, and large seeds in sand and sawdust.

ber of "Stop Sale" orders, 211 involved interstate shipments of seed. These cases were referred to the Federal seed control officials for consideration.

Several hearings on violations of the seed law were held before the Commissioner of Agriculture. Four cases were tried in county courts and convictions obtained. The Federal seed control office issued a number of warnings to out-of-state shippers of seed, who had violated the North Carolina seed law, and several convictions were obtained in Federal court. One lot of 255 bags of low-grade seed was seized and ground for feed by order of the Federal court.

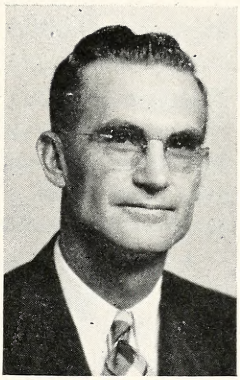
The present seed law, rules and regulations, were rewritten and became effective June 1, 1945. This new law conforms more closely with the "Uniform State Seed Law" as approved by the Association of Official Seed Analysts and the Federal seed control officials.

In brief, the changes made in the new law concern the tag and label requirements for seed on sale. Included are the latest approved standards and methods of procedure in testing seeds. The administrative duties and the enforcement provisions of the law have been clarified and strengthened.

The rules and regulations of the seed law have been rewritten to include some of the latest recommendations of the Association of Official Seed Analysts of America and the Southern Seed Control Officials.

SOIL TESTING DIVISION

DR. IVAN E. MILES



I. E. MILES

During the past four years, the Soil Testing Division has broadened its scope and expanded its services. It will be seen from the following tabulation that the number of samples tested per year has doubled since the beginning of this four-year period.

Fiscal Year	No. Samples Tested
1944-45	22,000
1945-46	22,000
1946-47	30,000
1947-48	42,000
Total	114,000

Inasmuch as each sample involves some four or five different tests, the above total indicates an aggregate of roughly one-half million tests made during this period.

In addition to the increased number of samples tested, there are farm groups now using the services which have never before manifested any particular interest in the work. This means that new farmers are being served.

The major portion of the work is necessarily that of analyzing the farmer's soils and assisting him with his liming and fertilization program. However, there are a number of other features involved in the overall soil testing program.

The Division has been of service to the research staff of the Agricultural Experiment Station. The animal husbandryman wants to build a good pasture for his experimental cattle; the agronomist wants to locate the proper soil for lime, phosphorus, or potash tests; the horticulturist wants to study the depth of penetration of plant food applied; any field-plot man wants to check upon the variability of the soil from plot to plot within his experiment. These and other things have been checked for the research staff.

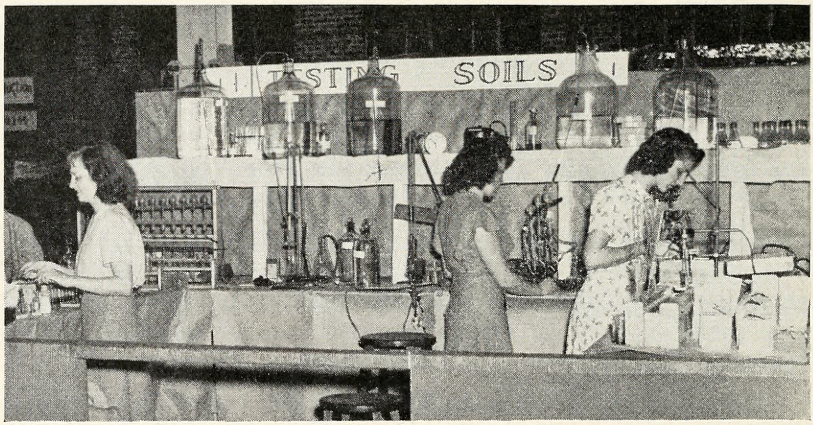
The Highway Department frequently tests the soils of the new highway roadbeds so as to use a sound lime and fertilization program in establishing vegetation on the areas subject to erosion.

The U. S. Engineers have frequently called on the Soil Testing Division to determine the salt content of soils in the drainage areas in the extreme Eastern part of North Carolina. In this

area careful attention must be paid to the salt content of soils at various depths and at various periods of the year.

The Soil Testing Division is cooperating with the Southern Nutritionists in their work on the relation of soil properties to the nutritional value of crops. There is considerable interest in the effect that soil conditions may have on the vitamin and mineral content of vegetable crops. The soil testing work in this program is handled by the North Carolina Soil Testing Division.

A number of other states and several foreign countries have sent representatives to North Carolina to study the Soil Testing program. Individuals have come from Mexico and from Central and South America, India and China, and some have stayed for weeks to study and see the program in action.



One of the most popular exhibits at the State Fair was one illustrating the actual operations of soil testing.

By way of enlarging the services to the farmers, some tissue-testing and analysis work is being done to supplement the Soil Testing program. With further research in these fields, it is anticipated that leaf and tissue analyses will make a material contribution. There is a very definite place for them, and they can and will complement the soil analysis work. This is particularly true in the trouble-shooting work where hunger signs or deficiency symptoms are the cause of concern to the farmer.

Some research work has to be carried on continuously so as to keep the program calibrated with plant growth in the field. A number of research agronomists have cooperated with the Division in analyzing the soil from individual plots within their

experiments. The results are expected to be of mutual benefit and interest to all concerned, in that they show the agronomist something of the variability of the soil and they enable the soil testing agronomist to calibrate the tests with plant growth or see where additional work is needed to calibrate the test with plant growth under controlled conditions. The analyses of soils from around plants that are showing distinct plant food deficiency symptoms are also of considerable help in calibration work.

The work logically divides itself into several different divisions; each of these divisions will be discussed individually.

LABORATORY

The techniques and procedures used in testing soils have not changed greatly during the four years. Hydrochloric acid 0.05-N is used as the extracting solution and has been satisfactory when calibrated with plant growth. The laboratory work can be discussed under two headings: namely, *routine* tests and *special* tests.

Routine tests.—All soils are tested for calcium, magnesium, phosphorus, potash organic matter, pH, and exchangeable nitrogen. Furthermore, all soils are classified as to texture, internal drainage, general susceptibility to losses by leaching, and soil series as nearly as possible from a laboratory examination. Many of these tests complement one another, and this assists in arriving at the final answer. For instance, there are at least six factors involved in determining the lime requirement, namely: calcium, magnesium, and organic matter content, texture of the soil, pH value and exchangeable hydrogen. With this number of complementary factors, the lime requirement can be figured quite accurately.

Special Tests.—Wherever the conditions seem to require it, special tests are made, including ammoniacal and nitrate nitrogen, manganese, total salt concentration; and occasionally, tests are made for iron and sulfate.

EDUCATION

Perhaps no part of the Soil Testing program is more important than the educational work. One important phase of this work is instruction in proper sampling. Indeed, the program is of little or no value if the sample submitted does not represent the

area involved. Improper sampling is perhaps the weakest part of the whole Soil Testing program. Most people do not realize how variable a field may be. This variation is brought out in the bulletin "Soil Testing One-Year Summary, July 1, 1944, to June 30, 1945".

There are other phases of the work on which people need more information. In the past, some people have expected too much from a soil test and others have not realized how much value it

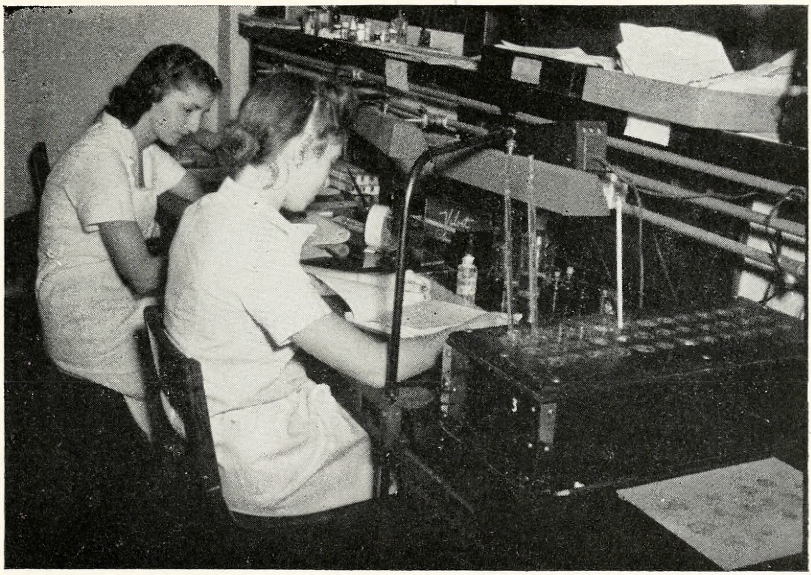
Determining the lime requirements of soils in the laboratory.

can have. If the program is understood, it will be recognized that certain things can be accomplished, whereas others definitely cannot be accomplished by testing soils. If the sample truly represents the field, the lime and fertilizer requirements can be determined pretty closely for the average season. The analysis can be used in identifying and learning the hunger signs or deficiency symptoms that show up on an improperly fed crop. Some information can be secured by means of classification of the soil as to crop adaptations, though it is desirable to do this in the field.

On the other hand, the Soil Testing program cannot assure a successful crop. A poor crop may be brought about by unfavor-

able climatic conditions, insects, diseases, crops not adapted to the soils, improper variety used, improper management of the soil, or a combination of one or more of these factors; nor can any testing of soils, however accurate and dependable, correct for a poor sample. Data collected and lime and fertilizer recommendations based on a poor sample may be misleading rather than helpful.

This should not discourage any one from sampling the soil, because any one can collect a good sample who can understand



Determining the amount of plant foods in soils

instructions. The instructions are provided for the farmer, both on the sample container and the questionnaire (or data sheet) which accompanies the sample container.

There are a few soils and crops in the State which have not been thoroughly investigated; and, consequently, data secured from other conditions somewhat similar to these must be assumed to be applicable to these situations. This may not always be absolutely correct. However, it is the best information that is available at the time.

Another phase of educational work which has proved quite popular during recent years is work with the Veteran Farm Trainees through Vocational Agriculture. During the last six months, the Soil Testing program has been explained to more

than 4,000 of these men. They received the instructions enthusiastically and many of them are testing their soils and following the recommendations.

FOLLOW-UP WORK

This phase of the work permits the agronomist to measure the success or failure of his work under field conditions. If the results found in the field are satisfactory under a broad scope of applications, it is felt that the work is satisfactory. By and large, this has been true in the past. However, a few inconsistencies have been found, and these tend to point out the things which need further research and refinement. This visitation program with the farmers and the agricultural agencies in the field serves to keep one practical in his outlook and in his recommendations. The selection of individual farms within any county to visit and study is left largely to the agricultural agency in the county which is sponsoring and assisting in the collection of the samples.

There is one other way in which farms are selected for follow-up work; there is sometimes an inconsistency between what the analyses show and what the farmer reports on the questionnaire. Gross inconsistencies are noted during the year and listed for the visitation program. When the Soil Testing Agronomist is in that county, he visits these particular farms and, in most instances, is able to straighten out the situation.

TROUBLE SHOOTING

This part of the work continues to grow and is extremely interesting. From time to time, a farmer who never had his soil tested fails to grow a satisfactory crop and decides that it is the fault of the fertilizer used. He calls in the agronomist to assist him in making a decision. This situation puts the agronomist in an embarrassing position, since he cannot always solve the problem with absolute certainty. With this one exception, however, this work is very stimulating and challenging. The trouble can usually be found, and this affords a great deal of satisfaction.

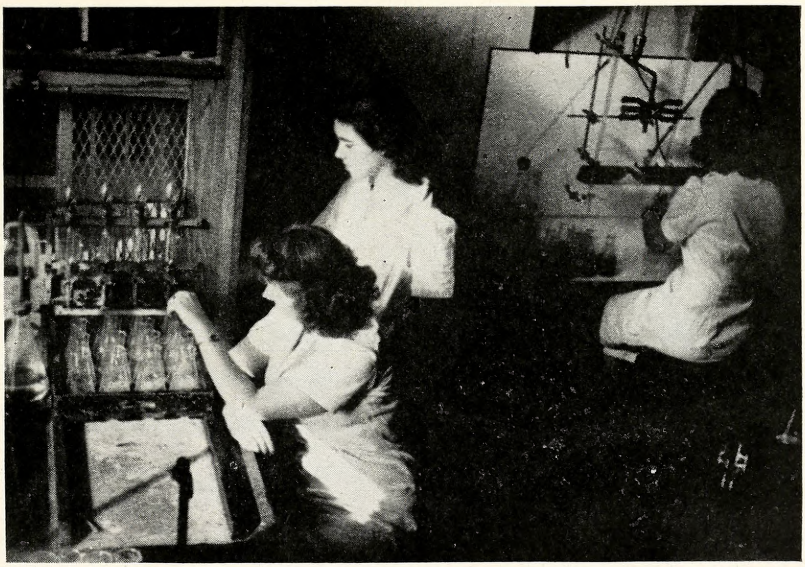
Often the trouble is due to poor management, improper liming and fertilization, extreme climatic conditions, or poor land use. Regardless of the cause, the farmer is in trouble. He has called for help; and in most instances, he is in the proper frame of mind to learn the cause and method of control.

The types of trouble most often encountered have been listed and illustrated in previous reports.

PERSONNEL

The personnel of the Division has been increased to handle the additional work promptly. At this time there are four chemists, two laboratory assistants, one secretary and four stenographers, one full-time agronomist and one part-time agronomist.

In discussing the personnel, it is interesting to note that men who were agricultural college graduates were used in the labora-



Determining the organic matter in soils.

tory exclusively, prior to the war. With the coming of war, accompanied by the shortage of manpower, girls were employed to do the laboratory work. The girls have done such a good job that in the future girls will be used almost altogether. Of course, this necessitates considerable supervision; but it is more economical per unit of work.

The stenographic force is quite large in proportion to the size of the Division. This is due to the fact that every farmer is written a detailed letter along with the report of the analysis of his soil. Extreme deficiencies are pointed out to him, and he is urged to do something about them. Management factors are often emphasized through these letters. Information and

programs from other agricultural agencies are worked into these letters when applicable to the situation.

ACKNOWLEDGMENTS

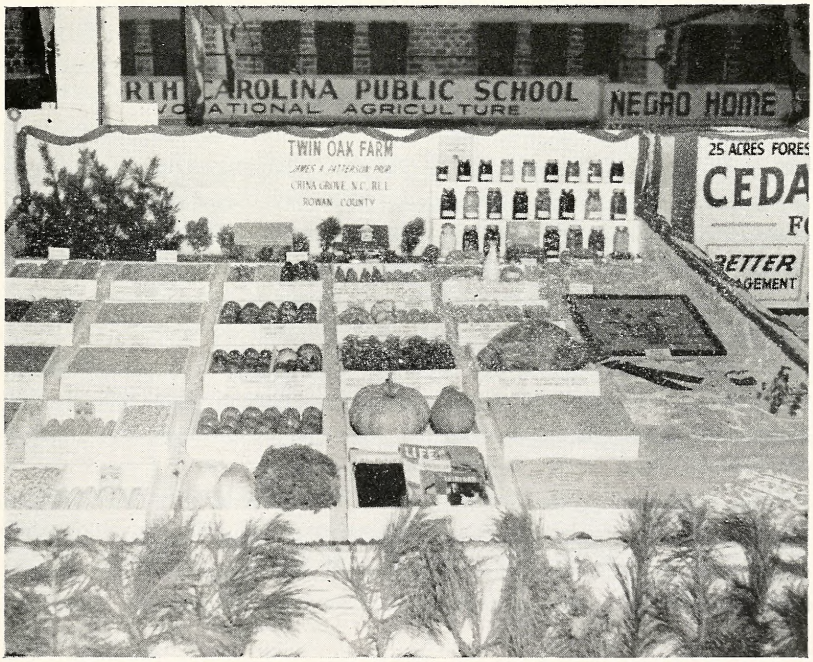
The Division is largely dependent upon the agricultural agencies in the field for assistance to the farmers in instructing and assisting them in the collection of the samples. Many agencies have been very helpful in this way. This is particularly true of the Soil Conservation Service, Extension Service, the Production Marketing Administration, and Vocational Agricultural Group.

THE NORTH CAROLINA STATE FAIR

DR. J. S. DORTON, *Manager*

During a part of this quadrennium the State Fair was suspended due to the war. This report reflects a period from January 1, 1946 to December 31, 1947.

The 1946 State Fair held October 15-19, 1946, was the first fair held after the end of the war. While highly successful from a financial standpoint, it did not, in the opinion of the management, measure up in educational and agricultural value and



One of the Many Exhibits at the N. C. State Fair.

exhibits to the previous high standard that had been established. This was due in a large measure to the fact that many wartime restrictions were still in existence and the further fact that the State Fair organization had not been completely re-established and people were war weary and uncertain. However, many outstanding quality exhibits were portrayed that left lasting impressions in the minds of the thousands who saw them.

To mention only a few, the Tobacco Exhibit, the Cotton Exhibit, and the Dairy Exhibit, all put on in a cooperative way by the industries, the State College and the Department of Agriculture, working as a great team, created exhibits that told the story of these three major subjects in a splendid way.

The 1946 State Fair had a total revenue of $220,544.03, showing a profit for the period of $78,104.90.

The 1947 State Fair held October 14-18, was in all phases the most outstanding fair in the long history of its operation. This is the opinion of dozens of unbiased observers who have attended many previous Fairs.

Insofar as agricultural, educational and industrial exhibits and interest were concerned, it has never been equalled in our experience. Every available inch of space in all buildings as well as in all livestock barns was filled to overflowing, making it necessary to house part of these exhibits in tents.

A week of continuous rain did not dampen the indomitable spirit of those thousands of North Carolinians who annually attend their State Fair although it did cut down the attendance materially, which is reflected in our financial statement.

The State Fair greatly expanded its water and sanitary facilities last year, extending an eight inch water main from the city limits into the Fairgrounds at a cost of $23,172.01.

During the year under review the profit from operations exclusive of laying the water line amounted to $22,421.13, with the State Highway agreeing to bear their part of the cost of the water line.

The present total assets of the State Fair are $139,470.83, represented as follows: State Treasurer, $63,333.33; Securities, U. S. Treasury Certificates 2½%, $75,000.00; Accounts Receivable $1,137.00.

DIVISION OF STATISTICS

FRANK PARKER

FRANK PARKER

An agricultural estimating service is to be judged by the services rendered, rather than by the volume of statistics collected. The Division of Statistics is rarely credited with its own products, since these are attributed to the "using" county leaders who better serve their local farmers because of this information. The farmers are the real source of the information and they are the final users and benefactors.

In 1919, the State Board of Agriculture entered into a cooperative agreement with the present United States Bureau of Agricultural Economics. This effected a merger of the efforts and resources of the two agencies in the collection and dissemination of reliable facts on the agricultural industry of the State. From this effort grew the Division that has been known since as the Crop Reporting Service. This cooperative agreement has been valuable to both agencies. Official government ratings of all state estimating offices show that North Carolina ranks quite close to second-place Illinois. It is significant that the states which lead in this work are those that have long had active cooperative relationships. In its information services, North Carolina and Wisconsin probably lead in spite of larger appropriations provided several other states. Thus this Statistics Division is providing maximum returns on its state appropriations.

As a cooperative agency the Agricultural Estimating Service serves as a clearing-house for farm statistical information. This office depends upon local or county sources for collecting information and distributing it to agricultural and business service agencies. This is the one and ONLY such official information office in North Carolina. Had its services not proven to be of the best, it would not have survived all these years since the U. S. Department of Agriculture was started in 1863. Its practical estimating methods are tried and proven.

GENERAL PICTURE

When the State-Federal Cooperative Crop Reporting Service was initiated in 1919, no State Statistics Division existed; therefore, a minimum demand and service was at first realized. Now, after 29 years of cooperative relations between the State and Federal Departments, the demand is for detailed COUNTY services that have long since been taken for granted by all agricultural service agencies as well as industrial interests. Even politicians expect *unlimited farm statistics;* in fact, the widely diversified demand is almost beyond measure and is steadily increasing with the realization of the needs for and the potential services which can be rendered with statistics. These users of statistics insist that more of the potential information (not being published for lack of funds) should be made available for utilization by the local service leaders. This the Statistics Division would like to do if and when the means are provided.

In spite of the serious handicaps brought about by the war and post-war years—such as lack of efficient personnel, printing, etc.—The Agricultural Estimating Service held its own. Since 1945 a much greater number of farmers, agricultural leaders, and business interests have cooperated in collecting and using agricultural information, resulting in an increased volume of work for public services. Entirely new phases of statistical endeavor have developed from war, reconversion, and post-war program needs.

SOURCES OF BASIC STATISTICS

The Federal-State Crop Reporting Service continues to collect all of its current basic data by mailed sample surveys. For this purpose, the Statistics Division maintains more than 70 different lists of classified crop reporters. These lists contain names of more than 30,000 volunteer reporters who regularly supply the information upon which current forecasts of acreage production, yield, price, livestock numbers, etc., are based. These are in addition to the 275,000 farmers who have in the past listed their inventorial farm records in the Annual Farm Census and the numerous threshing machine and combine operators who annually report individual farm records of grain production. All of the surveys made by the Statistics Division during one year yield more than 12 million items of information. These, except for the Farm Census records, must be transferred from schedules to listing sheets. Then they are edited for reasonableness and

accuracy, added and checked, weighted to correct for sample distribution, analyzed and adjusted to show approximations of real conditions. In the neighborhood of a million U. S. Government envelopes are used annually. All such mail goes first-class. This, at three cents postage per envelope, amounts to $30,000 of which at least $15,000 could reasonably be counted as savings to the State. In addition to these, thousands of reports are mailed under government franking privileges without envelopes.

The set-up and activities of the Statistics Division office make it a desirable training station for people who have chosen agricultural estimating as a profession. A number of foreign countries are establishing Agricultural Estimating Services patterned after the one now functioning in the United States, which is recognized as the largest and most efficient agency of its kind in the world, and during the past two years, this office has contributed to the training of representatives from South American countries, China, and India. In addition to these people, several members of other Federal services have spent some time in the North Carolina office.

The Crop Reporting Service truly is a unified effort. There is no line of demarcation between State and Federal work. Each contributes equally to the other to make the North Carolina office one of the three top leading states in this line of work.

An inventory of the statistical data now available in the office of the Crop Reporting Service and the services being rendered would show a number of gaps which need to be filled to provide a well-rounded statistical program. Demand for county income estimates is increasing rapidly. Such annual county income estimates would aid in rounding out statistical data for planning county agricultural programs. All state agricultural agencies are striving toward the same goal—the improvement of the state's agricultural industry. In the end, this means that the welfare of each individual farmer in the state must be advanced. In other words, the big effort is to raise the standard of living of the farmers to a level more comparable with living standards of other population groups. The best measure of such progress is income data. Only with county income data can this progress be measured on less than a state level. Planning information is the first essential.

SPEEDIER PRINTING—NEW SERVICES

During the war and post-war years, costs of material and supplies increased sharply. Printing costs advanced, threaten-

ing to limit the output of our services. Time requirements for getting a printing job done became such that much printed matter became obsolete before it was available for public distribution. A study was made to find some feasible means of overcoming this difficulty and at the same time live within the Statistics budget. Off-set printing equipment was secured. Thus, by the end of 1945 "home printing", with more services at less cost, was underway.

By the end of 1947, about 90 percent of the Division's printing requirements were handled in this office. The use of this offset printing equipment has proven to be a time and money saver. It has permitted more and quicker services, which are important since data of a current nature begin to lose their value soon after they are collected.

The use of printing equipment in the office has enabled the Statistics Division greatly to improve the services rendered. Early in 1947, a regular monthly, four-page, printed "FARM REPORT" was started. This report has permitted us to offer in one publication a large proportion of the reports released. Formerly, each report was published separately in mimeographed form. Now users receive in one compact, attractive publication a summary of all current statistics available on a wide scope of subject matter. It has been found that these "FARM REPORTS" are being read and retained for reference to a much greater extent than were the mimeographed releases. About 7,500 of these are being distributed to individuals each month.

Another new service initiated in 1948 was the supplying to vocational agricultural teachers ten copies each of a special issue of the monthly "FARM REPORT", which were to be used for their class and project work. These totaled 5,500 copies. This service was highly approved by the entire State educational staff. However, due to limited funds and overload of work, this service had to be discontinued.

A few of the printing jobs done in the Statistics Division during the past biennium are as follows:

1. Four-page monthly "FARM REPORT".
2. Annual Statistics publication, 44 pages.
3. County "FARM DIGESTS", 38 pages each.
4. Weekly Broiler Reports.
5. Farm Census Township record books, 20 to 85 pages each.

NEW DEVELOPMENTS IN THE FIELD OF STATISTICS

North Carolina has taken a lead in statistical services, which other states are rapidly copying. This is a challenge for us to keep ahead and be prepared for ever expanding economic services which, as yet, are largely untouched, including detailed *county* farm income, county statistical compilations, and a maximum of program planning material to be assembled from the mass of Federal reports.

Enumerative Sample Surveys: There are certain kinds of information that cannot successfully be obtained through mail inquiries, such as farm employment statistics, cost of production data, etc. The national demand for information of this nature resulted in the development of enumerative sample surveys. During the past two bienniums, quite a number of these Federally financed surveys have been made in North Carolina. Of especial interest were enumerative surveys conducted in the commercial potato areas, the main strawberry producing counties, and in the commercial Sandhill peach area. The results of these surveys gave commercial growers more detailed information than had been available before on items having a distinct bearing on the successful growing of their crops. To be successful, these surveys require high quality interviewers to collect the data. This, of course, makes these surveys expensive and to date has largely limited their use to the collection of specialized data which cannot be obtained through mailed inquiries.

Slaughter Reports: During the meat rationing period need for more information on livestock slaughter led to the establishment of a survey to secure monthly reports of the number and weight of meat animals slaughtered. During the war years all slaughter plants were required by law to submit these monthly reports. When rationing was discontinued, the demand for this information had reached such proportions that the survey has been continued on a voluntary basis.

Poultry Statistics: Another important statistical report developing out of the war years is the Weekly Broiler Report. Wartime food requirements necessitated detailed knowledge of locations and quantities of poultry. The Statistics Division was assigned the duty of collecting weekly commercial poultry statistics in 25 counties "frozen" by the O. P. A. At the end of the war, these weekly reports were discontinued; however, the use of this information by commercial broiler interests had become

so well-established that subsequent demand resulted in the setting up of funds from the Research and Marketing Act to reinstate this service. Thus, weekly commercial broiler reports were again started about January 1, 1948. These reports are regularly used by commercial broiler interests in planning their operations.

"Weather-Crops" reports: When the Weather Bureau was shifted during the war from the U. S. Department of Agriculture to the Department of Commerce, the agricultural interests suffered because the Weather Bureau's weekly crop comments were dropped. Due to the demand for this information in so many states, an informal agreement between these two governmental agencies resulted in the re-establishment of these weekly "Weather and Crops" reports in North Carolina in July 1945. This weekly sheet is based upon the card reports of carefully selected authorities from all parts of the State. In this way, up-to-date weekly information is provided concerning weather and its effects upon crops. The results have proved to be fortunate since leaders get a picture of conditions in other localities as well as in their own. Newspapers especially like this current information.

THE FARM CENSUS AND THE FUTURE?

North Carolina is the only southern state which has had adequate annual statistical information to provide its agricultural leaders, farmers, and others with annual county estimates of maximum reliability. The source of such information was the Annual Farm Census—in operation from 1918 through 1947. This thirty-year annual survey, basic to detailed agricultural statistics which are so essential to the 800 million dollar North Carolina agricultural industry, has been discontinued. This comes at a time when industry is putting more and more of its income and effort into collecting, analyzing, and using statistical data. Thus it seems wise for agriculture to contribute more instead of less constructive working information.

It might be well to consider some of the advantages accruing to the State from this source and some of the implications that the abandonment of the Annual Farm Census will have on the future development of agriculture in this State. North Carolina farmers held a distinct advantage over other southern states during the period of acreage allotments. The North Carolina Annual Farm Census provided individual farmers with accept-

able original proof of harvest claims. In the same manner, counties, and even the State, were protected and supported in their allotment claims.

What of the future? Tobacco and potatoes are the only crops under acreage control at the present time. However, last year peanut growers were faced with acreage quotas—later postponed. There is a general feeling that this crop, along with some others, will be returned to a quota basis. If and when this happens, where will the counties and farmers turn to secure acceptable evidence to provide support for claims?

The years 1944 to 1948 brought a heavy load of new demands on the Crop Reporting Service for agricultural statistical information. Many of these demands could not have been adequately met without the data supplied by the Annual Farm Census. The rationing of farm equipment and fuels emphasized the value of having up-to-date statistics. Tractor and fuel allotments were based upon 1940 United States Census data which, at the time, were five years old. Current information from the Annual Farm Census provided undisputable evidence of need and resulted in the tractor allotment being doubled and farm fuel oil supplies tripled. *What of the future?* Long-range planning in agricultural statistics is just as essential as long-range planning of actual production processes in industry.

Greater Possibilities from Farm Census Information Proven: In an effort to inform both agricultural leaders and the local public concerning the potential county-service possibilities available from the Farm Census and Threshers' data, "COUNTY FARM DIGEST" separates—30 to 50 page publications—were initiated in the Fall of 1945. These contained detailed county statistical information, by townships, and have proved to be the most valuable and desirable project thus far undertaken. Wisconsin is the only other State to attempt this kind of service studies, so North Carolina was proud to get in on the "ground floor" in this new statistical information bulletin. The TOWNSHIP information feature could put this publication ahead of all states save Wisconsin. That state has gone ahead with special legislative appropriations resulting in a special book (by townships) for each county of that great state. They consider this development as the best foundational advancement in Wisconsin's agriculture.

Several of these "COUNTY FARM DIGEST" bulletins were published and met wide acclaim among users of local agricul-

tural information. Inadequate funds limited the number which could be published. *What of the future?* The 1948 Farm Census, recently completed, will be the last possibility of such studies under the present legislative Farm Census Act until 1953!

NEW FEATURES IN DEMAND AND NEEDED

County Farm Digests (county and township working materials), based on 1948 Farm Census to last until 1953.

County farm income (gross and cash) by commodities.

Educational programs (not done by State College agencies)

General reports—understanding of purposes, uses, etc.

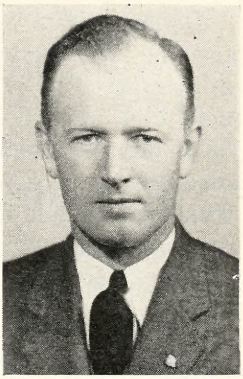
Farm Census and Threshers—justifications.

Dairy and poultry—new service needs.

	1944-45	1945-46	1946-47	1947-48
Schedules mailed—number of separate inquiries	281	409	292	365
Copies mailed (exclusive of Farm Census)	300,445	295,495	299,127	287,024
No. of questions on schedules mailed	4,924	6,033	5,952	5,978
Schedules tabulated (exclusive of Farm Census)	67,336	61,992	60,044	65,726
Separate reports released	112	124	116	142
Number of pages in reports	265	318	301	283
Number of copies issued	207,923	205,817	185,792	220,760
"Agricultural Situation" bulletins mailed	71,400	70,800	70,800	70,800
Mimeographed stencils run for Statistics Division	423	602	547	524
Multilith plates run for Statistics Division	.....	.....	188	197
Mimeographed sheets run for Statistics Division	292,298	393,975	298,805	237,855
Multilith sheets run for Statistics Division	.....	.....	494,650	760,765
Mimeographed sheets run for other Divisions	369,149	290,860	221,025	239,200
Mimeographed stencils run for other Divisions	982	816	706	744
Miles traveled in field investigation work (U. S. Dept. of Agriculture furnishes official car.)				
State-Paid	12,869	19,701	20,807	15,114
Federal-Paid	24,396	29,375	38,288	28,489
Total Miles	37,265	49,076	59,095	43,603
Personnel—Technical Workers: Statisticians:				
State	3	3	4	4
Federal	4	5	4	4
Personnel—Clerical Workers:				
State	11	12	11	11
Federal	9	9	8	8
Statistical reports developed during period	370	373	433	415
Estimated State expenditures, including salaries	$ 32,902	$ 36,824	$ 34,171	$ 44,770
Office space provided by State—square feet	3,649	3,325	3,325	3,325
Estimated cost of rent for above	$ 4,200	$ 4,620	$ 4,620	$ 4,620

DIVISION OF TEST FARMS

CECIL D. THOMAS



CECIL D. THOMAS

Mr. Fred E. Miller, Director of the Test Farms Division for the past twenty-seven years, died on February 21, 1948. Cecil D. Thomas, Executive Assistant Superintendent since December 1, 1947, then took charge of the program.

This quadrennial report for the period ending June 30, 1948, presents briefly the program of work and some of the accomplishments of the Test Farms Division, which includes seven farms or regional experiment stations. Detailed results of experimental work are published as bulletins or circulars by the North Carolina Agricultural Experiment Station and the United States Department of Agriculture. Therefore this reports deals largely with the broad program of work on each farm with special attention to physical facilities and to the general nature and scope of the research program.

COOPERATING AGENCIES

Research projects and the general farming programs are conducted jointly with the North Carolina Agricultural Experiment Station—the Department of Agriculture furnishing physical facilities and the Experiment Station furnishing technical personnel for conducting research work. The United States Department of Agriculture participates in a number of experiments for which it allocates specified amounts of money. Cooperative investigations receiving Federal funds are covered by formal memoranda of understanding, concurred in by administrative officers of participating agencies. Duke University through its Department of Chemistry also is contributing considerably to research in Turkish tobacco. Research projects on the test farms are under the direction of Dr. J. H. Hilton, Dean of the School of Agriculture and Director of the North Carolina Agricultural Experiment Station. The Director of Test Farms, in addition to supervising the seven farms, also has charge of the McCullers Branch Experiment Station, located near Raleigh, N. C.

GENERAL

General Field Days at the Test Farms were discontinued during the war period because of difficulties in travel as well as other factors. However, a number of special field days were held and have been increasingly popular. These special days have created much interest and are proving to be an excellent medium for presenting the latest results of research to the public. This type of field day has been held for dairying, poultry, tobacco and small grains, as well as for other enterprises.

The North Carolina Agricultural Extension Service through its subject matter specialists has assisted by coordinating plans for having county and other groups visit the farms for special field days. This planning has been a very important factor in the success of the program at all Stations, and has been of special significance at the Tobacco Experiment Station at Oxford. Because of the great interest in tobacco, the number of visitors to that station in the past has taken up much time of technical personnel stationed there. The Extension Tobacco Specialist developed plans whereby a majority of these interested groups were scheduled to visit the work within a two-week period and special arrangements are made for personnel to explain the experiments being conducted. This procedure has worked in a very satisfactory manner.

Although improvements in facilities at the Test Farms have lagged somewhat because of material shortages and high prices, plans are being developed to correct this situation as rapidly as possible. A program of mechanization is already underway and should add materially to efficiency of operation. A plan is in effect with one of the machinery companies by which implements are leased to the Test Farms on an annual basis. This program is aiding materially in replacing old implements as well as in securing new types of machinery which will enable the farms to conduct their operations in a more satisfactory manner.

The two farms which were relocated just before the beginning of the quadrennium, the Mountain Station now at Waynesville and the Tidewater Station now at Plymouth, as well as the new Upper Mountain Station at Laurel Springs, have all made remarkable progress. Construction of buildings and improvement of other physical facilities have been done at an encouraging rate. Much has been accomplished in drainage, clearing and improving land, fencing and improving pastures. The job is not yet

complete, but it is anticipated that during the next biennium a large part of the improvement work may be finished.

PIEDMONT EXPERIMENT STATION—STATESVILLE, N. C.

J. W. HENDRICKS, *Assistant Director in Charge and Agent, U. S. D. A.*

Station Established in 1903.

Area of Station, 233 Acres (State); 133 Acres (Federal).
Soil Type: Cecil Clay Loam.
Elevation, 950 feet above sea level.

Climatological Data:
Mean Annual Temperature, 60.0 Degrees Fahrenheit.
Average Annual Rainfall, 46.29 inches.
Total Snowfall, 1947, 18.5 inches.

GENERAL

The station renders public service through research activities, public meetings, demonstrations, correspondence, and the furnishing of information to the many visitors throughout the year.

During the past four years the Annual Field Days have not been held due to wartime and other restrictions. However, Small Grain Field Days have been held with excellent attendance each year. Approximately 2,000 were in attendance in 1948.

It has been the policy of the station to grow for increase purposes, recommended strains of our leading small grains. This work has been primarily with wheat, oats, and barley. The annual distribution of seeds has been approximately 2,000 bushels. The station has been unable to meet the demand for purebred seeds, and has rendered a service in bringing together farmers and buyers in local communities. The area of small grain distribution has extended from the New England States throughout the Southeastern and Gulf States. A small amount has also been shipped for export to other countries.

Over a period of years the station has been carrying a limited number of Poland China hogs as a source of breeding stock, but has not been able to supply the demand. From 12 to 14 purebred rams have also been released for breeding purposes each year.

The station continues to be a source of information on agriculture for the Piedmont section, and the increasing number of visitors each year will give some idea as to how its activities are appreciated. Monthly visitors during the summer average more than 500, these coming as individuals and in groups.

AGRONOMY

Cooperating with the N. C. Agricultural Experiment Station and U. S. Department of Agriculture

Small Grain Breeding and Variety Testing (G. K. MIDDLETON AND T. T. HEBERT) :

Oats: (1) The new Lemont variety has been outstanding on this station for the past eight years. Its average yield for this period has been 89.3 bushels, which was 18.4 percent better than

A Small Grain Field Day

Lee. This selection is from a cross of Lee x Winter Fulghum. The original cross was made by workers in the Division of Cereal Crops and Diseases, but this selection was made on this station.

(2) In addition to the regular yield trials, two cooperative uniform nurseries have been carried on at this station. One was the regular winter-hardiness nursery, with 30 entries; the other, a uniform nursery of the more promising fall-sown varieties. In

the latter test there were 33 entries. Most promising new material is a group of selections from a cross of Letoria x Fulwin. They are winter-hardy and certain of them carry resistance to rust and smut.

Barley: Due to excessive amounts of leaf rust, which occurred during 1945 and 1946, Sunrise has not maintained its outstanding lead, as formerly. Davidson, one of the bearded varieties, has shown more tolerance to this disease and in 1945 exceeded it in yield. Some very promising selections from a cross of Davidson x Sunrise are now in the tests. Some of these show fair resistance to smut, to mildew and some tolerance to leaf rust.

Wheat: One new wheat has been developed on this station in recent years and that a selection from Nittany x Malakoff. This selection produces high yields, has good leaf rust resistance and is of excellent quality. Still more promising is a group of stiff-strawed, rust resistant lines from the cross Frondoso x (Redhart x Noll). Additional testing will be needed, however, before one of these can be released.

Soil Fertility Studies (W. H. RANKIN).

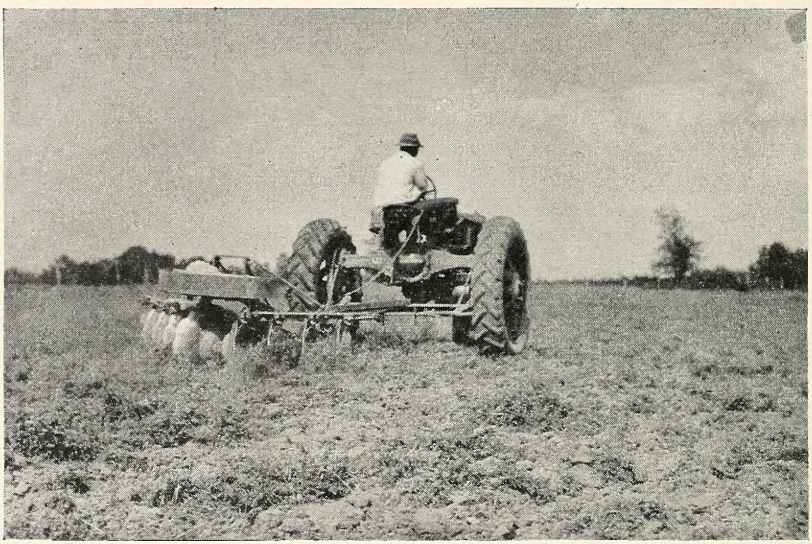
Time of Applying Nitrogen for Small Grain: Top dressing wheat with 16 lbs. of nitrogen (100 lbs. nitrate of soda) is more efficient if applied February 15 to March 15 than when applied after April 1. The same amount of nitrogen applied at seeding was ineffective in producing an increase in yield of wheat. Apparently the nitrogen was leached before the plants could utilize it. This experiment was completed with the 1945 harvest.

Amounts of Nitrogen, Phosphoric Acid, and Potash for Top Dressing Small Grain: This experiment was established on a soil that had been supplied with fairly liberal amounts of phosphoric acid and potash for several years, therefore the residues of these elements were sufficient to obscure any difference in response to phosphate and potash applications.

When 400 lbs. of a complete fertilizer were applied at seeding, a yield of 30 bushels per acre was produced. A top dressing of 16 lbs. of nitrogen (100 lbs. nitrate of soda) increased the yield 10 bushels per acre and 32 lbs. of nitrogen (200 lbs. nitrate of soda) increased the yield 14 bushels per acre. This experiment was completed with the 1945 harvest.

Amounts of Nitrogen, Phosphoric Acid, and Potash for Wheat at Seedings: The soil on which this experiment was conducted had been fertilized liberally for the previous crops, therefore potash and phosphoric acid responses were obscured by the residues. The yields of wheat increased as the nitrogen in the complete fertilizer was increased. The experiment was completed with the 1945 harvest season.

Amounts of complete fertilizer for wheat: An increase in yield of wheat was produced as the amount of complete fertilizer at seeding was increased up to 800 lbs. per acre. However, the



Disking down lespedeza for fall grain planting

increased yields produced from application above 400 lbs. per acre were not sufficient to justify them. This experiment was completed with the 1945 harvest.

Flax Project (W. H. RANKIN):

In cooperation with California Central Fibre Corporation, of Pisgah Forest, seed flax varieties are being grown at different nitrogen levels. Ecusta Paper Company, of Pisgah Forest, is using flax straw as raw material for producing cigarette paper, therefore is interested in a source of flax straw for that purpose.

Approximately one-half acre of seed flax was grown in both 1947 and 1948.

Corn Improvement: (PAUL H. HARVEY)

Eight acres of land have been used in testing corn hybrids on the station each year, using from 150 to 200 hybrid strains. The date-of-planting test showed that corn planted in April or May had nearly an equal chance of producing a satisfactory crop, while June planting was much lower in the four seasons covered. N. C. hybrid 1032, N. C. T1, N. C. T11, N. C. T23 in yellows and N. C. T20 and Tenn. 10 in white hybrids have been found superior to old form varieties, and are recommended to growers.

Soybean Breeding: (E. E. HARTWIG).

The Evaluation of Soybean Varieties and Selections: The varieties Roanoke, Volstate, and Ogden have proved superior to other existing varieties of soybeans for the production of seed for processing. Because of the similarity in plant types of Roanoke and Volstate, it is recommended that Roanoke entirely replace Volstate.

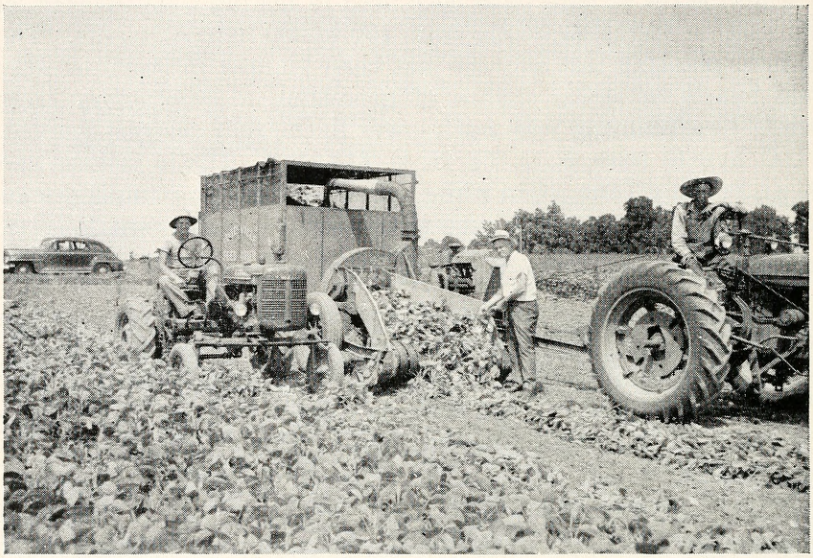
Future soybean investigations at the station will involve comparisons of new selections from the breeding program with the varieties Roanoke and Ogden in an attempt to find superior types. The station has been growing from 15 to 20 acres of Roanoke for seed purposes for the past four years.

Lespedeza Project (CLARENCE H. HANSON):

Hybrids and selections of annual lespedeza more suitable to use in small grain rotations are being grown. Varieties that mature earlier so they may be harvested earlier and thereby enable the farmer to prepare land for small grain earlier is the objective of this project.

Weed Control by the Use of Chemicals (GLENN C. KLINGMAN):

During the past two years (1947-48) considerable work has been done to control objectionable weeds in small grain, with more emphasis placed on eradication of ragged robin. Various materials with different strengths have been used. Perhaps the most satisfactory time to spray small grain is from March 1 to March 15. Weed control work with small grain has been encouraging. Some work has also been done with corn, cotton, and soybeans, spraying a few days after planting. The results with the cultivated crops have not been encouraging. It is the purpose of the station to continue this work, and with a little more information and data it is felt that the use of chemicals will play an important part in crop production.



Harvesting Soybeans for Dehydration

Field of Roanoke Soybeans

FORESTRY

Cooperating with the N. C. Extension Service. R. W. GRAEBER.

Forestry Variety Work: To determine the best variety of pines in this section. In this experiment we are studying the value of forestry in connection with soil building and erosion prevention. This experiment is 21 years old, but we are observing outstanding results and we are thinning for proper stand. From the standpoint of attracting visitors, this is one of our outstanding projects. We feel that it is playing an important part in timber growth and management for this section.

HORTICULTURE

Cooperating with the N. C. Agricultural Experiment Station.
M. E. GARDNER.

Peach Fertilization: The crop was killed by cold weather in 1945. The experiment was designed primarily to determine the effect of fertilizer combinations, with and without cover crops, on growth and production. Previous work had indicated that good production could be had by using N along under a system of clean culture followed by growth of natural cover, but the relationship of P and K was not understood. Results indicate preference for a complete fertilizer with planted cover crop. The trees, under this system of soil management, were easier to handle from the standpoint of pruning and gave a higher percentage of desirable grades of fruit.

Due to limited land area available at the time this orchard was planted, it was not possible to plant a sufficient number of trees to give the necessary plot replicates. The project was discontinued in 1946.

Fruit Variety Studies—Bunch Grapes: Variety tests are fundamental to a fruit program for two reasons: (1) to determine the adaptability of a variety to environment and use, and (2) as a source of breeding material.

Records have been kept on some seventy varieties and seedlings as follows: Vigor of plant, resistance to insects and diseases, bunches per vine, average weight per bunch, and, in the case of seedlings, a description of the plant and fruit.

In connection with the variety studies, differential fertilizer treatments have been started using the variety Niagara. The fertilizer studies have not progressed far enough to give significant results.

LIVESTOCK

Cooperating with the N. C. Agricultural Experiment Station, (EARL H. HOSTETLER, JOHN E. FOSTER, AND J. C. PIERCE, JR.)

A Study of Pastures and Their Utilization by Sheep: Grazing work has been in progress with sheep on annual pastures of Abruzzi rye and Korean lespedeza, barley and Korean lespedeza in comparison with permanent pastures. September seedings produced the only fall grazing, and yields of barley and rye were similar. Lespedeza yields were better following barley than rye. The highest yield for the season was produced by the November seeding of rye with lespedeza. The November seeding of barley with lespedeza ranked second in total seasonal yield. The permanent pasture produced less than any of the annuals.

Breeding Stock: The station furnishes ewes and purebred Hampshire rams as breeding stock when available, at reasonable prices.

COTTON BREEDING STATION

Cooperating with U. S. Department of Agriculture and N. C. Agricultural Experiment Station (THOMAS KERR, P. H. KIME, AND R. H. TILLEY):

Under a Public Works allotment of $56,000 to provide land, buildings, and other facilities for investigational work on cotton, a Federal Station was established in 1936, adjoining the Piedmont Experiment Station, at Statesville, N. C. Work at this station is cooperative with the State Department of Agriculture, the N. C. Agricultural Experiment Station, and other State agricultural agencies, with the object of improving the status of cotton production through (1) developing better cultural practices, (2) producing varieties superior in yield and quality and more resistant to diseases and other factors adversely influencing production, (3) studying the diseases of cotton and determining methods for their control, (4) determining the underlying principles concerned in the production of quality cotton and its improvement, and (5) developing and applying methods for utilizing and maintaining quality seed stocks, particularly through single-variety communities. These investigations are a part of a national program of improvements in production and quality American cotton.

Fundamental to such a program is a more thorough study of existing varieties from broad cotton belt standpoint. It is necessary to make a more complete inventory of the present cottons before the most intelligent sort of production is set up for further

improvement. Varieties are now being studied with a view of determining the influence of soil, region, season, and variety on yields, useful factors and quality of fiber as measured by field performance, ease of picking, ginning tests, technical measurements of fiber properties, spinning tests, etc.

Cotton Improvement: The breeding program included both inbreeding and hybridization methods. A large number of inbred lines and selections from hybrids, breeding stocks from other stations, and a few commercial varieties and strains were in yield tests. Purity of the station seed stocks was maintained in selfing blocks.

Hybrid Vigor Experiment: This experiment has been carried on for five years and shows that cross pollination increases the yield of cotton. Six crosses were compared with their parents during a three-year period. The first generations of the six crosses averaged 13.8 percent higher yields than their most productive parents. A higher rate of blooming during the early part of the fruiting period and earlier opening were also evident. No increase in growth of plant, size of boll or other plant character was recorded. Results obtained indicate that hybrid vigor in Upland cotton is expressed in characters which contribute to yield rather than to increased growth of plant parts.

In 1946 another project was started on hybrid vigor. Ten varieties or strains grown over the cotton belt were selected. These included large and small bolls, strong and weak fiber characters, early and late maturing, high and low lint percentages, and other characters such as seed size, lint index, and plant types. All possible cross combinations were made in 1946. The 45 crosses and the 10 parents were grown in a six-replication test in 1947 and 1948. Analyses are being made to determine the characters which combine to give high productivity and good quality fiber in upland cotton.

Selection Index Studies: Beginning with the 1948 crop season much attention will be given to methods of breeding and selecting. A new project, using several hundred plants on a selection index basis, has been started.

Fiber Spinning Studies: Each year about 10 or 12 of the most popular varieties in the Cotton Belt are grown at this station for spinning studies. The cotton is ginned at the station and shipped to Clemson, S. C. to the spinning and testing laboratory for analysis.

Chemistry of Cottonseed: During 1947 and 1948 a cooperative project with the Southern Regional Laboratory in New Orleans on the chemistry of cottonseed was conducted. Seed from some of the more important varieties were grown and shipped to the laboratory each year.

THE TOBACCO EXPERIMENT STATION—OXFORD, N. C.

J. M. CARR, *Assistant Director in Charge and Senior Agronomist, U.S.D.A.*

Station established in 1912.

Area of Station, 329 acres.
Soil Types: Durham and Sandy Loam.
Elevation: 500 feet above sea level.

GENERAL

The Tobacco Experiment Station at Oxford furnishes facilities for various phases of work on tobacco by a number of State and Federal agencies. Included in this cooperative program are the Division of Tobacco, Medicinal and Special Crops and the Division of Rural Electrification of the Bureau of Plant Industry, Soils and Agricultural Engineering of the United States Department of Agriculture. State Agencies include the North Carolina Agricultural Experiment Station and the North Carolina Department of Agriculture. The Aromatic tobacco program is conducted in cooperation with Duke University of Durham, North Carolina.

The Tobacco Experiment Station is located in Granville County, North Carolina, about one mile west of Oxford. It was established in 1912 on a tract consisting of 250 acres. The soils of this original land area consist mainly of the Enon and Colfax types varying from coarse to fine sandy loams. In 1941, an additional farm of 80 acres containing a high percentage of cultivated land of the Durham and Colfax soil types was purchased. In the spring of 1946, a two and one-half acre tract was leased from Mr. R. A. Crews five miles northeast of the Oxford Station. This location has been used since that time for tobacco fertilizer experiments. Another outlying tract of five acres was leased in 1948 by the North Carolina Experiment Station from Mr. Sam Pittard of Clay Station for use in the development of blackshank resistant varieties. This location was selected because of its initial infestation by the blackshank disease organism and its isolated location. It is used by the pathology staff and operated with the facilities of the Oxford Station.

CLIMATOLOGICAL DATA

The mean precipitation at the Oxford Station for the 27 year period, 1921-1947 inclusive, was 44.34 inches ranging from a maximum of 31.22 inches in 1930-1931 (July 1-June 30) to a maximum of 59.41 inches for the 12 month period July 1, 1945-June 30, 1946. The following table gives certain interesting climatological data for the four year period ending June 30, 1948:

Year	Rainfall Inches		Temperatures			Snowfall
July 1-June 30	Annual	Deviation from Mean	Mean	Highest	Lowest	Inches
1944-45	49.68	+ 5.34	60	100	12	1.25
1945-46	59.41	+15.07	59.9	101	13	7.50
1946-47	40.84	— 3.50	59.5	99	11	8.50
1947-48	47.30	+ 2.96	59.8	98	12	18.50

IMPROVEMENT AND ENLARGEMENT OF PHYSICAL PLANT AND FACILITIES

During the years 1945 and 1946 very little improvement was made in the physical equipment of the Station. However, in the spring of 1946 two new curing barns of frame construction were added for curing experiments. In 1947, two more of the same type were built from State funds. In addition, four other barns were erected by commercial concerns, two of wood, one of steel and one of aluminum.

In the summer of 1947 work was begun on an Engineering laboratory to be used by those men doing work on curing, grading and marketing. This building was completed in the spring of 1948 at a cost of approximately $37,000.00 and is now in use.

Repairs are needed on many of the buildings including workers' homes, storage buildings and animal barns. During the winter of 1947-1948, the Superintendent's home was repaired and redecorated inside.

In the fall of 1947 an agreement was worked out with The International Harvester Company whereby the Oxford and other Stations of the State could lease farm machinery and thereby mechanize these Stations without a heavy financial outlay. Most of this machinery has been received by the Oxford Station and was of much help in the 1948 operations.

OBJECTIVES OF PROGRAM

1. To develop tobacco varieties better suited to the requirements of the cigarette manufacturers and better adapted to the conditions under which the crop is grown on the farm. This objective is principally a breeding and selecting problem for the development of:

a. Higher yielding varieties of better quality.
b. Varieties resistant to diseases.
c. Combining resistance to two or more diseases in the same variety.

Plants in a bed treated the previous fall with one pound Uramon and one-half pound cyanamid per square yard.

2. To determine the nutritional requirements of crops by studying the influence of seven elements on yield, quality and chemical make up of the cured leaf.

3. To improve present methods of curing with the purpose of reducing curing costs and improving the quality of the finished product.

4. To continue cooperation with the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture in the study of tobacco insects.

5. To continue the development of aromatic tobacco in cooperation with the authorities of Duke University.

6. To furnish field facilities for studies of sucker control on flue-cured tobacco by the use of hormones under the direction of Dr. D. B. Anderson, Professor of Botany, N. C. State College.

7. To furnish field facilities for testing certain corn hybrids under the leadership of Dr. P. H. Harvey of the Agronomy Department of N. C. State College of Agriculture.

8. To furnish field facilities for the study of Granville wilt resistance in tomatoes under Dr. F. D. Cochran of the Botany Department of State College.

Left: Variety of tobacco resistant to Granville wilt.
Right: Variety of tobacco without resistant qualities.

PERSONNEL

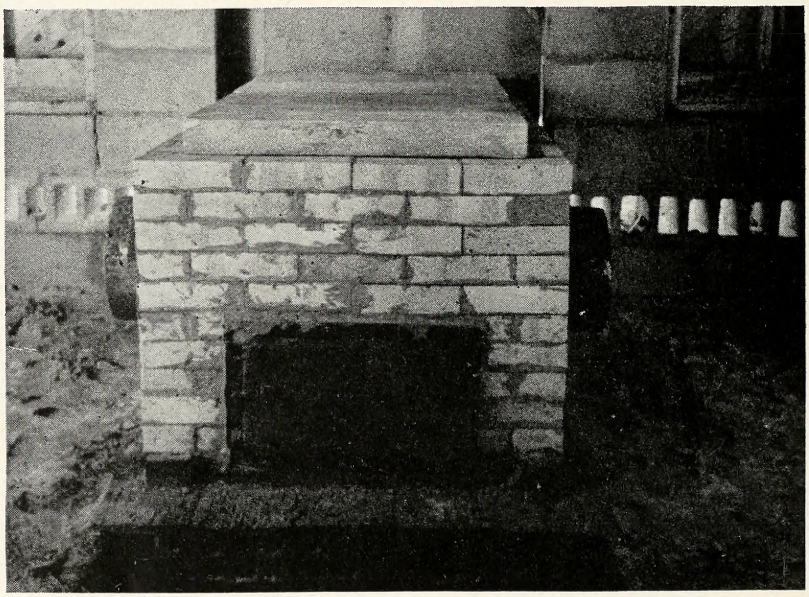
On December 1, 1947, Mr. E. G. Moss, who had been in charge of the Station since its establishment in 1912, retired. He was succeeded by J. M. Carr, who for 22 years had been doing agronomic work with flue-cured tobacco at the Coastal Plain Experiment Station in Georgia.

The Pathology research staff consists of two Pathologists, Drs. E. L. Moore and G. B. Lucas, with C. J. Wilson as Technical Assistant. Dr. Moore, who assumed his duties in June 1947, succeeded Dr. T. E. Smith who resigned in December 1946.

Major problems confronting the pathologists are the control of Granville wilt and blackshank diseases. While varieties re-

sistant to each of these diseases are being used by growers, it is believed that varieties of better type and higher resistance are needed. Considerable progress has already been made in this direction and yield and quality trials are now being made on a number of promising selections. A single variety resistant to both of these diseases is urgently needed for use where both occur in the same field. This is a rather complex problem, but considerable progress has already been made towards its solution.

During the years 1944-1947 inclusive, the agronomy work was conducted jointly by E. G. Moss and N. W. Weldon. On July 1,

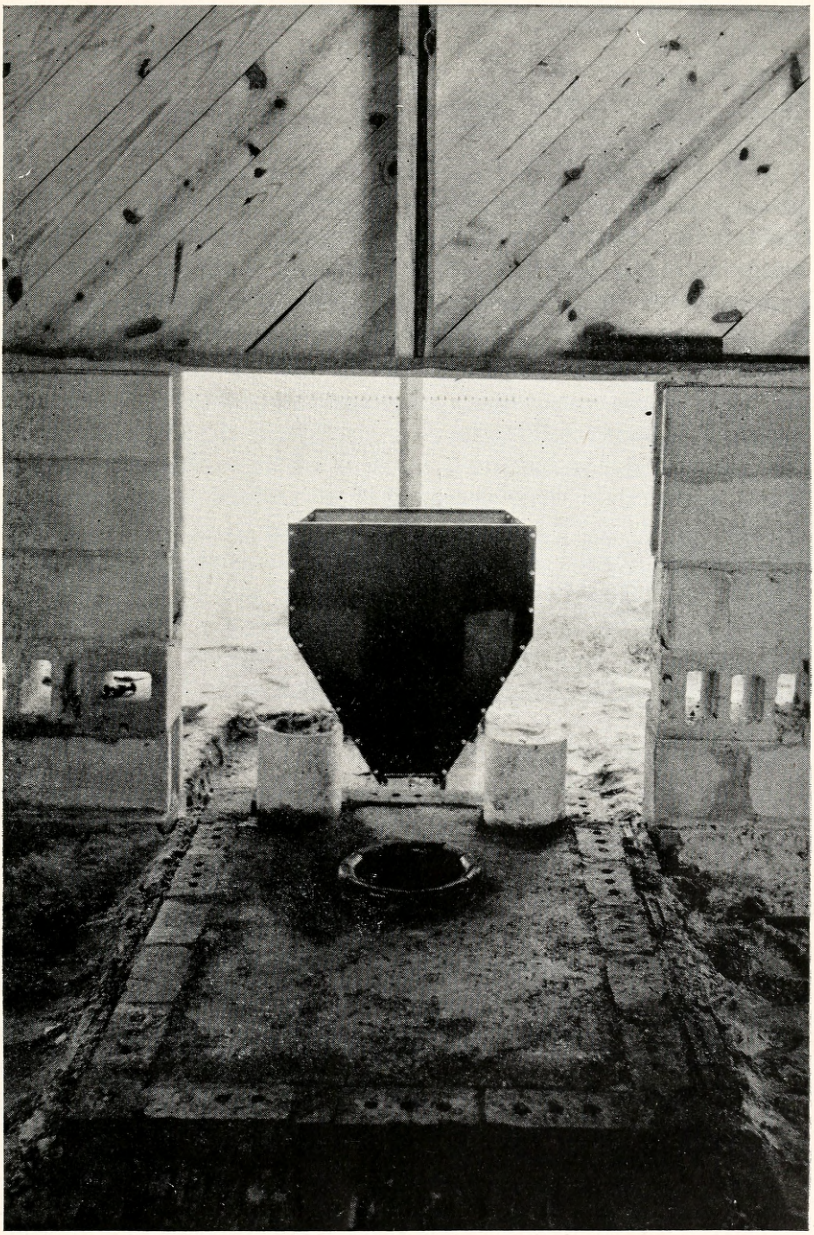


Rectangular type furnace built inside the barn, showing furnace door opening on end and flue pipe on the side.

1947, Mr. Weldon was transferred from agronomy work to the curing program. Dr. W. G. Woltz, a member of the State College staff, began his work at the Station in early 1946 and, upon the retirement of Mr. Moss and transfer of Mr. Weldon, assumed charge of the entire flue-cured tobacco agronomy program in 1948.

The agronomy program includes studies of the influence of seven nutritional elements on the yield, quality and chemical composition of the cured leaf. These studies are to be concluded in 1948. Sixteen varieties are being compared under disease

free conditions to determine those best suited to soils in the vicinity of Oxford.



Base of furnace, showing stoker, openings for admitting air, and retort in hearth.

Research on the engineering phases of tobacco is under the direction of Dr. O. A. Brown of the Division of Rural Electrification, Bureau of Plant Industry, Soils and Agricultural Engineering of the United States Department of Agriculture. He is being assisted by N. W. Weldon, L. B. Altman, Jr., Paul E. Green, Jr., R. B. Stone, Jr., and two technical assistants. These men are endeavoring to reduce the cost of curing and improve the quality of the cured leaf by the application of engineering principles. This includes developing more efficient heating units and making better use of air and moisture controls and insulation. Work has been started on new methods of curing and the possibility of using artificial light in grading and marketing. In order to supply green tobacco for these tests, 20 acres of tobacco are being grown each year. Ten curing barns are being used for this work.

Considerable work is being done on the problems of producing aromatic tobaccos. This work is under the direction of Drs. P. M. Gross, F. R. Darkis and F. A. Wolf of Duke University. L. A. Hart, a technical assistant located at Oxford, is in immediate charge of this work under the direction of the Duke authorities. Some of the problems involved are seed production, fertilization, varietal selection, handling, curing and grading.

Two federal entomologists, C. F. Stahl and J. U. Gilmore, are located at the Oxford Station. Field facilities are furnished these men for their studies of tobacco insects.

SERVICE FUNCTIONS

In addition to the eight objectives of the Oxford Station previously mentioned, all of which are research objectives, the Station furnishes certain services to farmers that cannot be considered within the realm of research. These services include:

1. Identification of plant disease and insect specimens brought in by farmers. Control methods are recommended if known and are applicable.

2. Visitors are always welcome and during the growing season are shown work in the field. During the fiscal year 1947-1948, approximately 6,000 visitors representing various agricultural groups came to the Oxford Station. These groups included:

   a. Farmers from entire State.
   b. Professional men in field of agriculture.
   c. Students.

(1) College of Agriculture
(2) Vocational and G. I. Schools
(3) High schools, both white and colored

d. Foreign representatives of the tobacco industry.

3. The Oxford Station maintains tobacco seed cleaning facilities for farmers who wish to bring seed in to be cleaned. In the fiscal year 1947-1948 seed totaling 5,064 ounces were cleaned for 250 farmers.

4. Foundation seed stocks of disease resistant and other varieties of tobacco are produced for distribution by the N. C. Crop Improvement Association each year. These seed are produced under the direction of the agronomists and pathologists and form the seed stocks from which certified seed are grown by the tobacco seed growers of the State.

5. As a part of the general farm program and as a service to North Carolina farmers, a small acreage of Weekley's prolific corn is planted for the production of certified seed. These seed are sold on the open market to farmers.

6. An additional service is rendered the farmers in the vicinity of Oxford by maintaining a registered Jersey bull and a Berkshire boar, which are always available for breeding for a small fee.

UPPER COASTAL PLAIN EXPERIMENT STATION— ROCKY MOUNT, N. C.

R. E. CURRIN, JR., *Assistant Director in Charge*

Station established in 1902.

Area of Station, 449 acres.
Soil Types: Rustin Coxville with Norfolk Series predominating.

GENERAL

Due to the shortage and high cost of both materials and labor, we were able to do very little in the way of improving buildings and fields on the farm. By concentrating most of our efforts on the research program, we were able to carry on all of the projects started, and to increase some when we thought it necessary to get better results. In the last 12 months we have been able to secure some badly needed equipment. We have built a new three-section tobacco barn equipped to use gas as fuel, and we expect to do considerable more building and repairing in the next year or two.

Instead of our annual Field Day, we have been holding special days for groups to inspect our work. The trips are usually sponsored by the County Agents and agriculture teachers in our section. The number of persons in the groups usually runs from twenty-five to several hundred. In addition to these groups, we have almost daily visitors, usually wanting some special information. Our biggest demand this year has been for information regarding the control of insects and diseases on all crops grown in this part of the State.

ANIMAL INDUSTRY

Swine Production (H. A. STEWART): This project is new to the Station and was initiated in 1947. Investigations are to deal largely with breeding and with utilization of feeds. Being in an area where corn, soybeans and other feed crops may readily be grown, it is thought that this project will be of great value. Already it has created much interest and has attracted many visitors.

The area of land allocated to the hog project consists of 85 acres which will provide for rotational grazing as well as other practices. Nine hog houses and shelters, two Manville storage houses, and one pump house are the buildings which have been constructed. The herd consists of seven brood sows, one boar, 10 gilts, and 49 pigs.

CORN

Corn Improvement (PAUL H. HARVEY): The corn improvement project has been conducted since 1938. Many hundred experimental hybrids have been tested during this 10-year period. During the past four years an average of 500 hybrids have been in test each season requiring from 12 to 16 acres of land. A number of hybrids have been released for farm production on the basis of results obtained from this testing program. N. C. 27, Dixie 17, N. C. 26, N. C. 1032, N. C. T20 and Tenn. 10 are in farm production this year. These hybrids have shown an average increase of 25 percent over the standard farm varieties in grain yield. In addition to these practical results shown in the hybrids released, a considerable amount of information has been obtained which will aid in future breeding experiments.

COTTON

Cotton Breeding (P. H. KIME): The principal objectives of the cotton breeding program are to develop types which are

Peanut, cotton and corn plots at Upper Coastal Plain Experiment Station.

highly productive and at the same time to improve the uniformity, strength, and other factors essential in the manufacture of high quality fabrics. A large number of inbred lines have been isolated from the Coker, Stoneville and other varieties. These have been in yield tests for two or more years and some have very good yield records, but the strength and other fiber qualities are no better than the parent variety. Several single and double crosses were made a few years ago and selections from these crosses have been in yield tests. A few of these hybrid selections were quite productive and had good fiber quality. Four sister lines were near the top in the variety and strain test.

Weather conditions, especially rainfall during July and August have a very pronounced effect on strength and other fiber properties. Fifteen varieties and strains were grown during both 1944 and 1945. July and August, 1944, were quite dry while the rainfall for these months was quite heavy in 1945. The fiber from these 15 varieties and strains averaged 31 percent stronger in 1944 than in 1945.

Weather Damage Causes Heavy Losses to Cotton Growers. Farmers lose from $10 to $50 per bale due to weather damage in the field. This is a conservative estimate based on government loan rates, and does not include damage to the seed or losses due to cotton falling out on the ground.

Twelve varieties, representing the leading types of the cotton belt, were grown at the Upper Coastal Plain Station in 1947 for studying weather damage. The field was defoliated about September 20 and the bolls were nearly all open by October 1. Samples of each variety were picked from the middle part of the plants on October 1. The remainder of the crop was left in the field until November 21 when other samples were picked from each variety. The ginned samples were graded and stapled by government classers and samples of lint also sent to the fiber laboratory for routine tests. The samples of lint picked on November 21 were from one to four grades below those picked on October 1 and the staple lengths were from 1/32 to 1/8 inch shorter. Results obtained from the fiber laboratory also show that both length and strength of the fiber decreases with weathering. There were some indications that certain varieties withstand weathering better than others.

Defoliation of Cotton (W. L. Nelson and P. H. Kime): Under conditions of a heavy foliage development in 1945, dusting with 30 pounds per acre of Aero Defoliant to remove the leaves reduced

the amount of boll rot and the pickers were able to pick the cotton 10 percent faster. Fiber strength determinations made on samples from the first and second pickings indicated that defoliation does not injure the strength or quality of the fiber if the top bolls are at least 30 days old when the defoliant is applied.

Effect of Nitrogen, Phosphorus and Potash on Yield and Fiber and Seed Quality of Cotton (W. L. Nelson and J. J. Skinner): Three years data on continuous cotton show a marked yield response to nitrogen and potash and a small response to phosphate. Excessive quantities of potash reduced the fiber and yarn strength somewhat. Sixty pounds of potash increased the oil content of the seed three percent.

PATHOLOGY

Cotton Seed Treatment (S. G. Lehman): Ceresan, the standard material for cotton seed treatment, continues to give large increases in seedling stands. However, Ceresan is decidedly disagreeable to workers in the seed treatment operation. A search is being made for a seed treatment preparation less disagreeable to use and at the same time equally effective in control of diseases of cotton seedlings. Many new chemical preparations have been eliminated by preliminary greenhouse tests. A considerable number which showed up well in the greenhouse were given their first yield trials at this station in the period covered by this report. By means of these field tests a preparation known as Dow 9B and containing zinc trichlorophenate was selected as the most promising of the new materials yet found for cotton seed treatment. It is being recommended as a substitute for Ceresan on cotton seed. It is distinctly less disagreeable to work with and is devoid of the highly toxic mercury salt contained in Ceresan.

Certain modifications of the chemicals in Ceresan and Dow 9B are currently being given field trials. These are giving sufficiently good results to justify the expectation that they will eventually replace the chemicals now being used for cotton seed treatment.

Soybean Seed Treatment (S. G. Lehman): In seed treatment tests at this station, Arasan dust has given worthwhile increases in germination of soybean seeds more frequently than other dusts used. Also good increases have been obtained from Spergon and Ceresan. Some seed lots have not benefited significantly by seed

treatment, but with other lots the increase in germination has been highly significant. The average increase for all seed lots treated with Arasan in 1947 was 40.1 percent while the average for the two seed lots which benefited most from use of Arasan was 97 percent. Arasan consistently gave slightly higher increases in seedling emergence than Spergon.

Summary of Peanut Experiments Conducted on the Upper Coastal Plain Branch Station by the Plant Pathology Section of the Botany Department During the Period from 1945 through the spring of 1948 (J. H. Jenson and Will Cooper) :

Peanut Seed Treatment and Germination Studies: These tests were conducted during the spring of 1945, 1946 and 1947. Unfortunately, the germination of the seed used in the 1945 planting was so poor that the data obtained were not significant. The results of the 1946 and 1947 tests are summarized in Table 1. These data represent the average number of plants surviving out of six replications of 100 seeds each. Several other seed protectants were also tested each year. In general these also increased the germination to about the same extent as the three materials shown in the table. The germination of artificially cured, plump seeds was not decreased when dried at 100 degrees F., only slightly so at 120 degrees F., and approximately 40 percent when dried at 140 degrees F. The germination of mod-

Fertilization Experiments with peanuts, Upper Coastal Plain Experiment Station.

erately shriveled seed was greatly decreased by these heat treatments.

Leaf-Spot Diseases Control Studies: These tests were designed to test the effectiveness of sulfur and copper-sulfur dusts in the control of leaf-spot diseases of peanuts. The 1946 study also included two, four, and six percent copper (on metallic basis) with clay as a diluent. The copper without the sulfur did not give satisfactory results; therefore, these treatments were not included in the 1947 and 1948 tests. The results of the 1947 test are shown in Table 2. Preliminary studies are now in progress to determine the effect of some of the newer organic fungicides on the leaf-spot diseases of peanuts.

Stem, Peg and Root Rot Studies: A comprehensive study of the causes of these diseases, conditions favoring their development, the losses caused by them and possible control measures, was initiated this spring. In order to carry out these studies a field laboratory was set up on the Upper Coastal Plain Branch Station and a Plant Pathologist stationed there throughout the crop season.

TABLE I. Peanut stand averages from six replications of 100 seeds each. Variety N. C. 4. Two years data, 1946 and 1947. Upper Coastal Plain Branch Station, Rocky Mount, N. C.

Seed Condition	Seed Treatment							
	Arasan		Ceresan		Cuprocide		Untreated	
	1946	1947	1946	1947	1946	1947	1946	1947
Hand Shelled								
Plump	59	89	63	88	59	88	58	87
Sl. Shriveled	--	90	36	88	--	85	31	82
Med. Shriveled	34	81	25	78	24	81	24	79
Sev. Shriveled	--	54	16	50	--	48	12	48
Disc. Plump	72	74	61	70	74	73	56	66
Injured	--	--	--	--	--	--	--	--
Machine Shelled								
Plump	63	88	62	88	72	84	50	75
Sl. Shriveled	--	88	45	90	--	85	37	77
Med. Shriveled	38	72	31	72	30	72	23	64
Sev. Shriveled	--	65	20	61	--	61	16	58
Disc. Plump	64	72	65	70	61	69	49	57
Injured	48	83	44	78	47	71	21	41

All seed were furnished by the U. C. P. Branch Station and came from the same lot each season whether hand shelled or machine shelled. The seeds were graded into the following classes: plump, slightly shriveled, medium shriveled, severely shriveled, discolored plump seeds (those showing blemishes, probably due to microorganisms, on the seed coats) and injured seeds (those showing obvious injury due to the shelling process).

The data presented are averages only, as statistical analyses have not been completed.

TABLE II. The control of peanut leaf-spot diseases by the use of sulfur and copper sulfur dusts for the year 1947. The acre yields are based upon the average of six plots. Upper Coastal Plain Branch Station, Rocky Mount, N. C. The dusts were applied with a four row duster, and applications were made according to the recommendations issued by the North Carolina Experiment Station.

Treatment	NUTS—Pounds		HAY—Tons	
	Per Acre	Increase	Per Acre	Increase
No Dust	1,997	--	3.19	--
Sulfur	2,278	281	3.73	0.54
Sulfur + 2% Copper	2,371*	474	3.98**	0.79
Sulfur + 4% Copper	2,602	605	4.05	0.86
Sulfur + 6% Copper	2,456	459	4.03	0.84

*This is based upon the average yield from four plots as an accident prevented the determination of the other two plot yields.

**This is based upon the average yield of five plots.

PEANUTS

Peanut Fertility Investigations (J. F. Reed and N. C. Brady): An experiment was set up in 1945 to study the effect of time and rate of application of various liming materials, landplaster, phosphorus and potash upon peanut yield and quality. A response was obtained in 1945 from all materials containing calcium. The highest yielding plots were those receiving a broadcast application of dolomitic limestone at the rate of 2400 lbs. per acre.

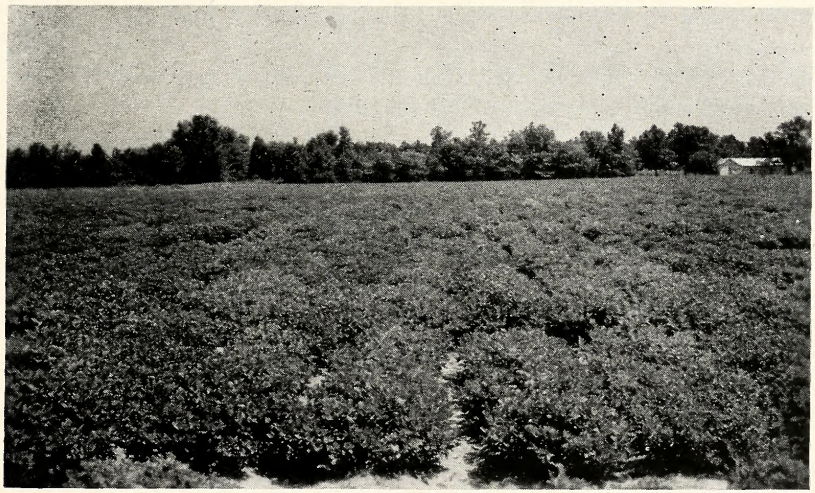
The effects of landplaster additions upon the yield and quality of peanuts from plots which have received various rates of limestone is to be determined in another experiment which was begun in 1945.

Peanut Breeding (W. C. Gregory): This station is the center of concentration of the experimental testing associated with the entire program of peanut breeding. The nature of the breeding work with peanuts is such that during the early fundamental stages of development the experimental material must be concentrated at one place where the facilities, and especially a large force of experienced hand labor, are available.

Since 1945 a rigorous program of investigation into the fundamental nature of the breeding behavior and variability of cultivated peanuts has been in progress on this station. The nature of this work involves the separation of each individual plant from its parentage and other close relatives and a multiform measure of each individual's contribution to the complex of heritable behavior following hybridization.

The present program was initiated with a limited approach to F1 hybrid testing in 1945 where the 10 most diverse types of peanuts known to be cultivated were crossed into all the 45 possible single cross combinations. At this time only 2,000 individual plants were harvested, cleaned and dried on the station. In 1946 this number jumped to 3,750 and in 1947 the harvest was a continuous operation of hand picking, cleaning and weighing from October 1 until November 1.

It should be emphasized that the experiments described above constitute actually a single investigation, the results of which



Peanut breeding studies, Upper Coastal Plain Experiment Station.

are only partially available and the final phase of which will be concluded with the 1948 harvest. This report indicates somewhat the nature and extent of the experimental program. The results will be released at a later date.

Rotation Experiments (J. F. Reed, W. L. Nelson and N. C. Brady): The effects of four winter cover crops on cotton-corn and cotton-peanut rotations are being studied in one experiment which was initiated in 1942. The yields of cotton and corn have been increased by the use of leguminous cover crops. This was due to the nitrogen supplied by the legumes. Both legumes and non-legumes increased the yield of peanuts.

An experiment was set up in 1945 to determine the proper time and rate of application of fertilizezr constituents and lime

in a cotton-peanut rotation. This experiment will be continued for at least six years.

TOBACCO

Tobacco Studies (W. G. Woltz and W. E. Colwell) : Studies on flue-cured tobacco were discontinued at this station in 1941 because of the lack of personnel to carry on the work during World War II. Owing to the large acreage of tobacco grown in the Coastal Plains of North Carolina and realizing that the problems of producing good quality tobacco on Coastal Plain soils are different from those in producing tobacco on Piedmont soils, the reinitiation of tobacco studies at this Station was given prime consideration in the expanded tobacco research program after the war. Two experiments, one on fertilization and one on varieties, were started in the spring of 1946.

Additional studies have been initiated each year. At the present time the tobacco work at the station includes one fertility experiment consisting of 25 fertilizer and lime treatments, one variety experiment consisting of 16 tobacco varieties, an investigation on the control of wireworm, a study on the control of sucker growth inhibitors, and two plant bed fertility investigations. These investigations involve approximately six acres of experimental tobacco. Emphasis is being placed on studies involving ways and means of improving the quality of tobacco and lowering the cost of production.

TIDEWATER EXPERIMENT STATION—PLYMOUTH, N. C.

J. L. REA, *Assistant Director in Charge.*

Station established in 1943.

Area of Station, 1995 acres.

Soil Types: Peat, Bladen Portsmouth, Hyde and Coxville Groups.

GENERAL

The old Blackland Station located at Wenona was sold in August 1944 and the personnel, livestock and equipment were moved to the new Tidewater Station as rapidly as conditions would permit. The usable buildings on the Tidewater Station were not sufficient to meet the needs, but some repairs were made to the old buildings to make them usable until the building program could be started.

The building program on the Tidewater Experiment Station was started on January 1, 1945. In order to move the personnel

from the old Blackland Station as quickly as possible, it was necessary to put up the dwelling houses before starting construction on the outbuildings. From January 1, 1945 to June 30, 1946 the following buildings and additions were completed: Two new five room brick dwellings; one old house moved and completely remodeled; five room house and two acres of land purchased; the main dwelling painted inside and out, with new roof added and bath room built; concrete-block fertilizer building; concrete-block building for storing dynamite; frame hay barn; new concrete-block implement building; new concrete-block pump house and cattle barn; new concrete-block pump house at the main dwelling; and two drilled deep wells.

From July 1, 1946 to June 30, 1948 the following buildings and improvements have been made: New concrete-block barn with concrete pens on each side of barn; overhead tank and water system installed at the cattle barn; pressure water system installed at the main dwelling; plumbing and hot water heaters installed; 6,000 feet of tile drainage put in; 65 acres land cleared or partially cleared for crops and pastures. All main and lateral ditches on the farm have been cleaned to improve drainage on all cultivated land and five miles of fence were constructed for sheep and cattle experimental work.

When the Tidewater Experiment Station was taken over on October 1, 1943 the main drainage outlet canal was almost completely blocked with trees and other obstructions. It was necessary to clear the banks and dynamite the canal until such time as the canal could be draglined. This work involved a great deal of hand labor but the benefit derived justified the expense until the dragline work could be completed.

The dragline work has been completed for a distance of 7,700 feet. This should give ample drainage for that part of the farm that the new canal now drains. The canal should be extended for a distance of about one and one-half miles to drain a major portion of the remainder of the farm and to furnish drainage for about 600 acres of pasture land.

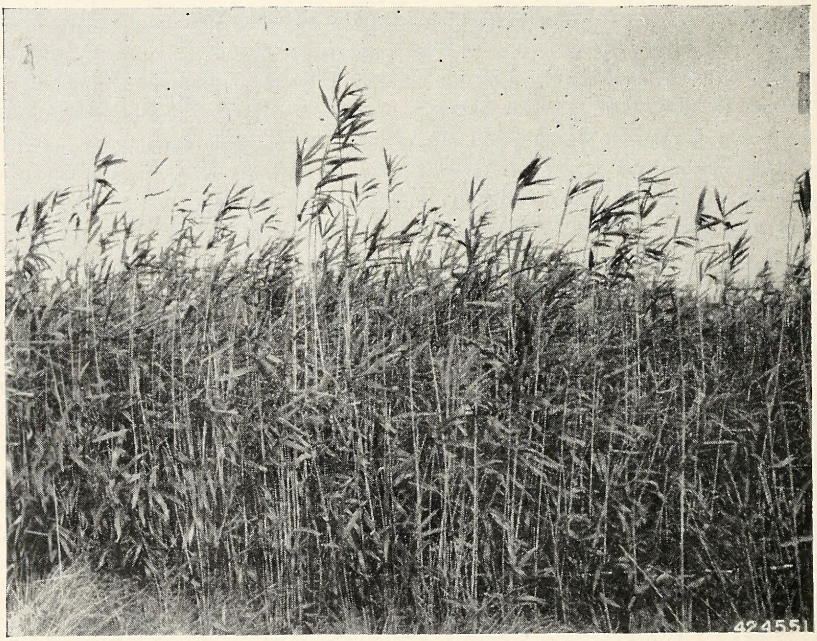
Due to the lack of fencing and pasture on the Tidewater Station it has been necessary to lease land to carry on the cattle program. This has been a serious handicap and has involved considerable travel as the pasture is some distance from the station. It is hoped that we can put up fences and seed sufficient pastures to take care of the cattle program within the next year or two.

The station is rapidly being developed to take care of an extended experimental program. Our experimental work during the war years was curtailed due to a limited personnel and other shortages.

ANIMAL HUSBANDRY RESEARCH

In Cooperation with the N. C. Experiment Station, EARL H. HOSTETLER AND JOHN E. FOSTER, *and the U. S. Department of Agriculture*, H. H. BISWELL.

Utilization of Reeds in Forest Grazing: There are over nine million acres of forest land in the Coastal Plain region of North



Native reeds used for grazing.

Carolina. Forest land grazing in this area makes up 29 percent of the yearlong keep of beef cattle and reeds are the most important source of native forage.

Phase I. (Tidewater Station)

A. Rotational Grazing: These studies have been completed and showed that continuous grazing, from the standpoint of both cattle gains and conditions of pastures, was equal to monthly or midseason rotation. This would mean a vast saving in cost of extra fencing, watering and other facilities and labor required

for rotational grazing. Fencing alone at present prices, even in this area where posts can be driven, costs about $350.00 per mile.

B. Creep Feeding Calves: These studies have also been completed. Creep feeding under these conditions did not increase the weights or finish of the calves enough to offset the cost of grain consumed and the extra labor involved. This is especially important at the present time when there is a scarcity of both meat and concentrate feeds. A calf creep-fed from May 1 to November 15 will consume approximately 600 pounds of concentrates. In a herd of 50 calves this would be a saving of 15 tons of concentrates.

Phase II. Wintering Calves on Reed Pasture (Blackland Station)

Weaned calves are wintered on good reed pastures plus either two or four pounds of cotton seed meal, just as satisfactorily and cheaper than similar calves on the farm that had winter pasture and harvested feeds. In fact, two pounds of meal daily were just as good as four if the cattle were to be grazed the following summer. Summer gains were in reverse order to winter gains.

This brings out that vast areas in eastern Carolina can be used for wintering calves with a great saving in harvested feeds. The reeds replaced approximately 10 pounds of hay per head daily or a total per calf of 1650 pounds from November 15 to May. For every 50 calves wintered in this manner, over 40 tons of hay or its equivalent would be replaced by forest range. About four acres of reeds were required to winter a calf.

New Subproject No. 1: Effects of Heavy Grazing and Moderate Grazing on Reeds and on Cattle Gains, at Wenona. This test has been going only one season but the results are showing the importance of proper stocking of reeds in order to get maximum cattle gains and still maintain good forage on the range. Over grazing reduced the cattle gains and length of grazing season, and seriously injured the stand of reeds.

New subproject No. 2: Use of Reeds in Finishing Yearling Steers, At Wenona. This test has also been going only one season. The results indicate, however, that reeds may well be used in the program to furnish roughage for finishing cattle. The range replaced about 10 pounds of soybean hay per steer daily. For 150-day feeding periods this would be a replacement of 1,500 pounds of hay or over 22 tons in finishing a car load of steers.

If beef breeding cows can be wintered satisfactorily in the forests on native forage and a reasonable amount of protein concentrate, it will be a practical and economical method of wintering. Not only is it essential to determine a satisfactory way to winter the breeding herd in this area in order to meet the increased demand for beef, but the most practical amount of concentrates to feed for maximum production is of vital importance. These concentrates are scarce and in much demand for other purposes, therefore no more should be fed than is absolutely necessary to keep up production and general health of the animals. This amount can not be determined definitely until the trials are repeated and the effects on subsequent calf crops are studied.

Publications issued or manuscripts prepared during the year:

"Comparison of Different Amounts of Protein Supplement for Wintering Beef Cows on Forest Range in the Southeastern Coastal Plain." Journal of Animal Science. Vol. 4, No. 4. November 1945.

Subproject No. 6: Wintering Calves on Reed Pastures. Phase II (Purnell P 14-Ai3). A trial of this study was not conducted in the winter of 1945-46 because the location of the test farm was moved. Pastures and fences were not available at the new location for continuing the studies this year, but it is hoped in the future to continue them.

Publications issued or manuscripts prepared during the year: Bulletin No. 342.

New subproject No. 1. Effects of Heavy Grazing and Moderate Grazing on Reeds and on Cattle Gains (at Wenona). Purnell P 14-Ai3. The first trial, to study the effects of heavy and moderate grazing on dense vigorous reeds and on cattle gains, and to develop "yardsticks" for judging utilization, was conducted at the Tidewater Station from May 11, 1945 to Oct. 26. Six 15-acre reed pastures were used for this study and the treatments were run in triplicate. The heavy grazing consisted of six grade Hereford cows and their calves and the moderate grazing consisted of four similar cows and their calves. The cattle were weighed at 28-day intervals and the forage in each pasture sampled at the beginning and at the end of the grazing season for composition, density and vigor. Degree of forage utilization was measured at the close of the grazing season.

All gains were lower than in previous years, probably due to the excessive rains. The cows in the heavily grazed pastures

just maintained their weights for the season and their calves made an average daily gain of only 1.09 pounds. In the moderate grazed pastures the cows averaged .19 pounds gain for the season and their calves 1.16 pounds. Although some of the pastures were utilized more heavily than others at the end of the grazing season, the study has not gone far enough yet to determine the effect the different intensities of grazing will have on the stand of reeds and on the grazing capacity.

Properly stocking reed areas to prevent over-grazing and killing the reeds, and to produce maximum cattle gains, is one of the biggest problems in their proper management. Previous studies have shown that reeds are easily killed if over grazed during the summer but more information is needed on optimum rate of stocking for maintaining vigor in reeds and for best cattle gains. If "yardsticks" can be developed whereby the proper use of reeds can be determined in different types of stands, it will be possible to avoid over-grazing, killing the reeds, and destroying the grazing capacity of forage ranges.

New Subproject No. 2: Use of Reeds in Finishing Yearling Steers. (*Purnell P 14-Ai3.*) A trial to determine the practicability of finishing steers completely or partially on reed areas by the addition of concentrated supplemental feeds after about August 1, rather than finishing entirely in the dry lot, was conducted at the Tidewater Branch Station from May 10, 1945 to March 15, 1946. Twenty-four grade Hereford yearling steers that were produced at the Station were grazed together on reed areas until August 31 and then divided into three uniform groups. (The division was postponed from August 3 due to an outbreak of anaplasmosis which killed two of the steers.) Group 1 (check group) was grazed on reed areas until November 22 and then finished out in the dry lot to March 15 on shelled corn and low grade soybean hay, full fed, and two pounds of cottonseed meal* per head daily. Group 2 was grazed on reed areas and fed five pounds of cottonseed meal* per head daily and a full feed of ground corn until March 15. Group 3 was grazed on reed areas until November 22 and then fed in the dry lot the same as Group 1 until February 15. The steers were weighed individually at two 88-day intervals and graded on August 31, November 22 and when finished for market.

*Peanut oil meal fed for the last month and half.

The results of this trial indicate that good reed pasture can well be used in either partially or completely finishing cattle for market. Gains on reeds alone after August are very poor but can be greatly increased by the addition of concentrates. The system followed for Group 2 saved about 10 pounds of hay per head daily and the system in Group 3 shortened the feeding period about one month. The concentrates consumed per cwt. were 733 pounds, 927 pounds, and 832 pounds for groups 1, 2, and 3, respectively.

The steers made an average daily gain of three-quarters of a pound per head for the grazing period from May 10 to August 31. After being divided on August 31 for the period to November 22, Group 1 (unsupplemented) made an average daily gain per head of only .33 pound, Group 2 of 1.51 pounds and Group 3 of 1.29 pounds. After going into the feed lot on November 22, Group 1 made an average daily gain of 2.05 pounds until finished on March 15. For this same period Group 2 (on reeds and concentrates) made an average daily gain of 1.36 pounds. From November 22 until finished on February 15, group 3 made an average daily gain of 1.92 lbs. Each group was carried to an average grade of low choice before selling, but group 1 was not carrying quite as much finish as the other groups.

Finishing yearling steers in the dry lot after about November on corn, soybean hay, and cottonseed meal has proved to be rather expensive. It is quite possible that it would be cheaper and more practical to finish or partially finish yearling steers by feeding them concentrated supplement feeds on reed areas where there is an abundance of forage. This would greatly reduce the amount of land needed for hay production. At the same time it would be making use of palatable forage that would otherwise go to waste. Observations have shown that reeds can be used to most any degree during the winter without damage to the grazing capacity; hence not as much time and care need be given to pasture inspection as during the summer. Furthermore, reed forage can be depended on to furnish late fall and winter grazing year after year.

AGRONOMY

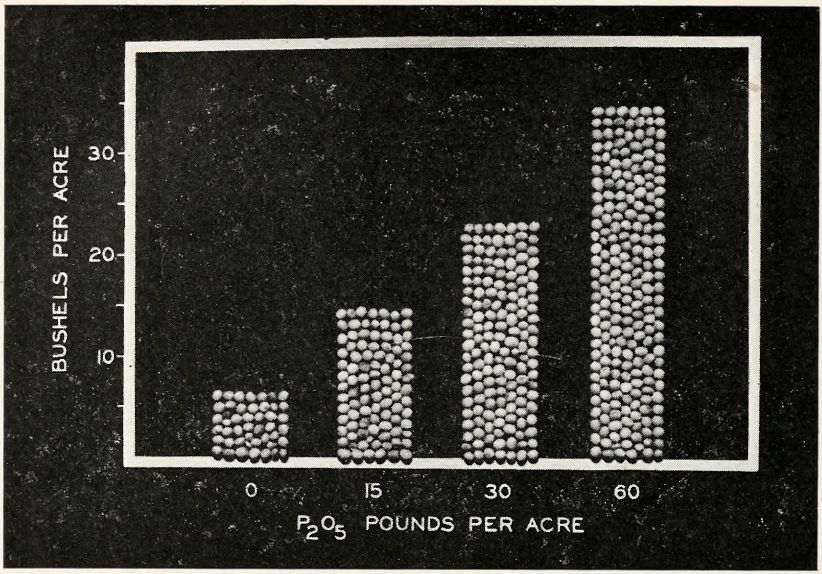
Agronomy projects under way are as follows:

1. *Study of Various Spacing of Hybrid Corn.* (Dr. B. A. Krantz, Mr. L. E. Brown).

2. *Potash and Nitrogen Studies With Corn.* (Dr. Krantz and Mr. Brown.)
3. *Radiophosphorus Rate on Corn.* (Dr. B. A. Krantz, Dr. N. S. Hall.)
4. *Corn, Soybeans and Dixie Crimson Clover for Winter Grazing.* (Dr. W. L. Nelson, Dr. B. A. Krantz and Dr. R. L. Lovvorn.)
5. *Corn-Soybean Interplanting.* (Dr. Krantz and Dr. Nelson.)
6. *Potassium Requirements of Soybeans after Irish Potatoes.* (Dr. W. L. Nelson and Dr. C. D. Welch.)
7. *Phosphorus Requirements of Soybeans after Irish Potatoes.* (Dr. W. L. Nelson.)
8. *Phosphorus Uptake by Soybeans Using P 32.* (Dr. W. L. Nelson.)
9. *Effect of Rate and Source of Liming Materials on Irish Potatoes.* (Dr. W. L. Nelson.)
10. *Use of Radioactive Phosphorus to Study the Uptake of Phosphorus by Irish Potatoes.* (Dr. P. H. Harvey.)
11. *Corn Hybrid Test to Study the Various Hybrids in Comparison With Open Pollenated Varieties.* (Dr. P. H. Harvey.)
12. *Soybean Variety Test to Compare the Newer Varieties and to Study Disease Resistance and Adaptability.* (Dr. E. E. Hartwig.)
13. *Small Grain Variety Test.* (Dr. G. K. Middleton and Mr. T. T. Hebert.)
14. *Observational Grass-Legume Nursery.* (Dr. R. L. Lovvorn, Dr. W. W. Woodhouse and D. S. Chamblee.)

Miscellaneous grasses and legumes were established in September, 1944 and 1945. Three Medicago species, Tifton Bur Clover *(M rigidula), Florida Black Medic (M luplina),* and Button Clover (*M. orbicularis*) made outstanding growth in the 1945-46 season. These species were not tested in 1944. Big Trefoil *(Lotus uliginosus)* also made very good growth. Of the Trifolium species observed in both seasons, Ladino, Louisiana white, Subterranean and Persian clover made satisfactory growth, standing in the order given. Both crimson and red clover made very good each year. Low hop clover made poor growth in both seasons.

Among the grasses, orchard and tall fescue seem to be adapted. Kentucky blueglass and bromegrass made poor growth.



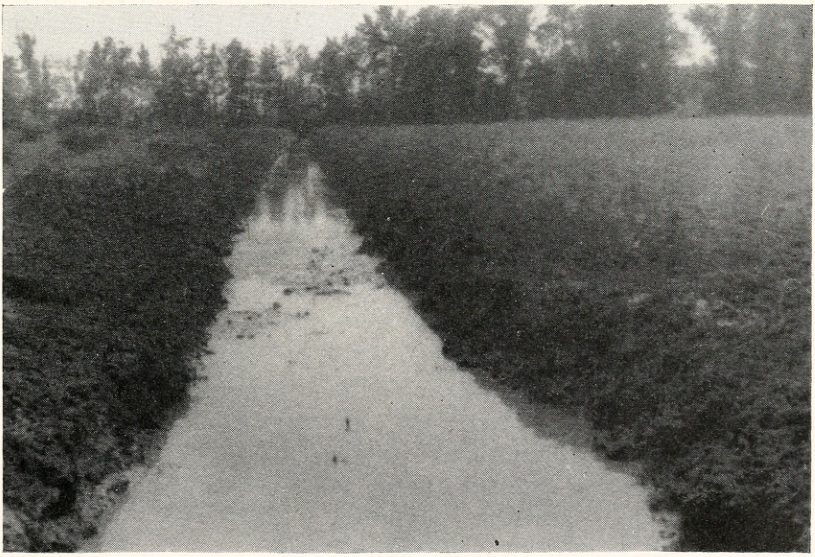
Additions of phosphate increased soybean yields on a soil very low in soluble phosphate.

Oat Variety Test (G. K. Middleton, T. T. Hebert): An oat variety test was conducted on this station in each of the last two years. Of the named varieties, Letoria was the highest in grain yield in 1945. This is one of the better rust and smut resistant varieties previously found adapted to the Piedmont area.

Soybean Seed Treatment (S. G. Lehman): Certain bacterial and fungus diseases of the soybean are seed borne. In cold wet soils many of the germinating seeds are destroyed by soil-inhabiting fungi.

A number of seed treatment materials have been tested on soybean seeds at the Tidewater Station to determine if significantly higher germination might be obtained. Nearly all chemicals used have increased germination more or less but with many of the chemicals these increases are not great enough to be considered significant. Germination of some seed lots is increased much more than others by seed treatment. As a result of tests at the Tidewater Station in 1944 and 1945, Arasan has been selected as the seed treatment preparation most likely to give worthwhile increases in seed germination. The average increase in germination of six seed lots treated with Arasan and planted at the station in 1945 was 13.1 percent, while the

Old ditch before dynamiting.



Ditch after dynamiting.

average increase for the two lots which benefited most was 18.6 percent.

Grape Vineyard (C. F. Williams) : The Muscadine grape work is carried on in cooperation with the North Carolina Experiment Station and the U. S. Department of Agriculture.

The project is to study the varieties of Muscadine grapes suitable to this locality as well as the cultural methods best suited. The work was started in the spring of 1946 and has not progressed enough to obtain results.

Drainage Investigations (Ellis G. Diseker) : An experiment to study the various types of drainage has been conducted on the station farm. This experiment covers an area of 45 acres, with the following methods being tried out:

1. Tile drainage at 2, 3, and 4 ft. depths, with different spacings for each depth.
2. Open ditches 3 ft. deep at different spacings.
3. Bed drains, double and single at different widths.
4. V ditches 18 inches deep at different spacings.

A detailed study of the water table levels will be made of each drainage method used.

Public Relations: The field days were cancelled during the war years due to travel restrictions. Special days have been held at the Station from time to time to study work with small grains, forage crops, corn and soybeans.

Since the war, classes of veterans visit the Station almost weekly to see the various phases of experimental work. Farmers and County Agents make use of the Station to see work that is of interest to them from time to time.

The Station expects to carry on most of the experimental work with early Irish potatoes as soon as land and facilities to handle this work can be provided. Up until this time the work with potatoes has been limited, due to the lack of drainage on the Station. Since the canal has been draglined this condition has been relieved and the work is expected to move at a much faster pace.

COASTAL PLAIN EXPERIMENT STATION—WILLARD, N. C.

CHARLES T. DEARING, *Assistant Director in Charge and Agent, U.S.D.A.*

Station established in 1905.

Area of Station, 445 acres.
Soil Type: Norfolk Sandy Loam.
Elevation: 51 feet above sea level.

PUBLIC RELATIONS

During the war period no annual field days were held, but there were a number of conferences attended by research workers from this and other states for the purpose of studying and keeping in touch with the work of the station. Meetings of this type were held in relation to the forage crop work, the dairy work and the small fruit work. Smaller meetings were held relating to other projects. The usual flow of visitors to the station for the purpose of gaining agricultural information continued. General Marston and his staff from Camp Lejeune visited the station and the station workers have visited Camp Lejeune and carried on correspondence for the purpose of assisting in agricultural phases relating to the development of this marine base. A good many marines from this base and soldiers from Camp Davis, Fort Bragg and other army camps visited the station for the purpose of studying the agriculture of this section in anticipation of making use of the information in their own agricultural activities following the war.

Since the war visitation by the public has been stepped up considerably. In lieu of the annual farmers field day and picnic, the station has substituted a series of special days relating to different phases of the station's activity, such as the Dairy Day, the Small Fruit Day and the Poultry Day. These occasions have brought to the station groups of around 500 people interested in the particular subject. These special field days have proven very beneficial and popular. A number of special groups have also been entertained and shown around the station during the past two years. These groups have consisted of county agents from other districts, future farmer classes, county agents with groups of farmers and veterans' agricultural classes and others. The station staff has given a good deal of time in the last two years to veterans classes studying the work of the station. These classes have ranged from around 25 veterans up to as many as 200, and most of the groups have spent an entire day and have been given personal attention by the superintendent and his staff. The station has endeavored to do all that it could to assist

these veterans in reestablishing themselves in agriculture, and while the work has been somewhat taxing on our small staff, it has, nevertheless, been a pleasant task cheerfully assumed.

The dairy project leader has recorded the following visitors interested in this activity during the calendar year 1947 and the first half of 1948:

Date of Visit	No. of Persons	Visiting Group and Person in Charge
1/22/47	15	Veterans classes, Franklin School, Harrells Store, N. C.
1/28/47	68	Veterans classes, Pamlico County, R. C. Noble.
4/17/47	375	Dairy Field Day.
4/26/47	200	4-H Judging Contest, District—10 counties.
5/ 2/47	105	Veterans Classes, Plain View High School, Harnett County, Dunn, N. C. J. H. Parker.
5/ 9/47	3	L. B. Kellogg, Rte. 3, Pittsboro, N. C. (Father, Gordon H. Kellogg, and wife).
5/13/47	38	County Agents, Northeastern N. C., Dean Schaub in charge.
5/20/47	10	Veterans classes, Surry Co., J. K. Thompson, Mountain Park, N. C.
5/31/48	35	Veterans classes, Columbus Co., Mr. Goodwin, Chadbourn, N. C.
6/ 3/47	34	Veterans classes, Brunswick Co., E. Mintz and W. T. Sellers, Shallotte, N. C.
9/ 9/47	22	Veterans classes, Sampson Co., Garland, N. C., E. Mintz.
9/11/47	36	Veterans classes, Sampson Co., Garland, N. C., Mr. King, (Negro).
9/12/47	60	Veterans classes, Pitt Co., Winterville, N. C., Mr. Mobley.
9/18/47	22	Voc. Ag. Students, Duplin Co., Wallace, N. C., Mr. Fields.
9/19/47	30	Veterans classes, Lenoir Co., Deep Run, N. C., Mr. Mallette.
9/24/47	28	Veterans classes, Wilson Co., Wilson, N. C.
9/25/47	18	Voc. Ag. Students, Duplin Co., Wallace, N. C., Mr. Fields.
9/29/47	32	Veterans classes, Lenoir Co., Kinston, N. C., Mr. Herring.
9/29/47	40	Veterans classes, Lenoir Co., Kinston, N. C., Mr. Sholar.
10/ 1/47	60	Veterans classes, Columbus Co.
3/15/48	78	Veterans classes, Columbus Co., Whiteville, N. C., Mr. Thomas.
4/ 9/48	28	Voc. Ag. Students, Sampson Co., Franklin School, Harrells Store, N. C., Ag. Teacher.
4/15/48	400	Poultry Field Day.
4/21/48	500	Dairy Field Day.
5/ 7/48	55	Veterans classes, Pitt Co., Greenville, N. C., Mr. Little.
5/14/48	65	Veterans classes, Brunswick Co., Shallotte, N. C., Mr. Sellers.
5/21/48	58	Veterans classes, Pitt Co., Grifton, N. C., Mr. Eagles.
6/ 1/48	16	Veterans classes, Brunswick Co., Bolivia, N. C., J. H. Tinga.
6/15/48	17	Veterans classes, Pender Co., Burgaw, N. C., Jesse Murray.

Correspondence relating both to the official relations between the station and the various research projects of the State and Government, correspondence of an informative nature with the citizens of the State and of other states has increased considerably during the period of this report. The increasing activities of the station bring on more correspondence and more office work of all kinds, but there has been no increase in personnel for handling this work.

IMPROVEMENTS

During the war years the energy of the station staff was directed toward maintaining the station under difficult conditions and labor shortages. It was necessary to allow various features of the station to deteriorate. For example, the road system became badly eroded for lack of labor to maintain repair service. Electric wiring has also deteriorated due to normal wear and tear, storms and injury from falling tree limbs. This wiring system was installed before the major growth of the station began. The size of the wire is inadequate at present and for want of earmarked appropriations, the wiring has continued to deteriorate. A vital need of the station at the present time is the complete overhauling of the electric wiring system on the State's property, rearranging it for purposes of simplification, using heavier wire to carry the present loads and providing better safeguards as protection against fires.

In spite of war conditions, however, we did succeed in bringing about considerable improvements in connection with the dairy side of the station through the installation of considerable pasture fencing, the installation of water lines to the pastures, and the establishment of a 10 acre forage crop pasture of kudzu.

Since the war, considerable improvement work has been carried on. The houses now occupied by the assistant superintendent and the senior dairy herdsman were refinished and modernized. The superintendent's residence, which also serves as the station hotel or boarding house, has undergone heavy wear and tear and is in need of considerable improvement, especially painting inside and out and the installation of adequate heating facilities. The present facilities are outmoded and are a fire hazard.

During the war years there was a complete breakdown of the water system for the station, and at the end of the war the Board of Agriculture provided $7,000 for purchasing and installing

new equipment. A deep well centrifugal electric automatic pump and a 15,000 gallon steel storage tank, 80 ft. in height, were installed and connected to the station water system. This new installation has afforded for the first time adequate water pressure for normal uses and fair fire protection in the form of two fire hose outlets from which the main group of station buildings can be reached immediately with a fair supply of water. However, it is still necessary to provide fire hose, and a second deep well is needed as an improvement to be tied in with the present system in order to insure against over-using the one existing well and to take care of continuing service when there are breakdowns. Under present conditions any breakdown of the equipment at the one operating well would throw the entire station out of all water supply. This is a risk which the State could hardly afford to take, considering the high temperatures of summer and the needs for providing water to the various homes and buildings on the station and for the livestock.

During the last two years the station has carried out a project of constructing a new poultry plant to replace the old plant which has been used for many years and was inadequate and in an unserviceable condition. The new plant was started in the autumn of 1946 with an appropriation of $12,000. An effort was made to contract this work, but the bids received were not considered appropriate and the station undertook the construction work on this project. It has been carried out in this manner within the estimates of the engineers of the Budget Bureau.

In the first fall and winter a laying house and a breeder house were erected. Following this, with an appropriation of $20,000 from the last legislature, a laying house, a breeder house and a brooder house were constructed in the fall and winter of 1947-48. Ten range houses were constructed and a six-acre range was developed around them. Surrounding and dividing fences were constructed on this range and it was planted to Ladino clover. All service facilities, such as wiring, plumbing, sewerage, etc., were installed. New equipment, including a new 6,000 capacity electric incubator, has been installed within the limits of the appropriations provided. We now have a most modern and up-to-date poultry research plant.

The plant, however, is not considered to be complete at the present time. There is still need for an appropriation to cover the construction of one additional brooder house and the necessary concrete walk and driveways. Moreover, all buildings in

the project have only been primed with paint. A complete double coat of paint is needed on woodwork and the cinder block needs to be painted with water proof paint.

The main object of this poultry construction is to provide an adequate research plant. However, the work has been undertaken in cooperation with other agricultural agencies for the purpose of setting up a major regional poultry development project for Southeastern North Carolina. The object is to establish, first in Pender County, where the station is located, a cooperative county project, starting off with 200 farmers each carrying 200 pullets. As the project enlarges in this county and as it becomes coordinated and successful, it can spread to adjoining counties of Southeastern North Carolina with a view to developing this section as a strong poultry district with national reputation. This station will play the part of providing necessary research, furnishing foundation stock from a healthy, tested and productive flock, and later furnishing the many cockerels which will be needed in the various flocks of the cooperators.

Other agencies in cooperation have provided a cold storage and packing plant at Burgaw, N. C., where eggs can be stored in the flush season and sold cooperatively when eggs are scarce. The plant also has plucking facilities which will permit the cooperative marketing and freezing of poultry. Through the Extension Service a special assistant county agent for poultry work has been provided, with headquarters at Burgaw. Under the leadership of this specialist an educational program is being carried out among the individuals participating in the general project.

On the dairy side of the station, under existing appropriations, we have been hard pressed during the last two years, especially because of the high cost of feed, materials and labor. This has been made more acute by the fact that the station does not have adequate cleared land to permit the maximum production of home feeds. This condition is being remedied as far as possible by a project directed at the clearing of 23 acres of timber land and developing this as a permanent pasture area immediately adjoining the dairy barns. This will release the present permanent pasture, which is improperly located across the railroad, for use as crop land.

In the spring of 1948 the dairy side of the station was strengthened by the installation of a new concrete stave silo, 12 ft. in diameter by 30 ft. in height. This silo will supplement the two galvanized iron silos already installed and will serve the calf

and maternity barn. A new hay drier was constructed in the hayloft of the milking barn to permit better handling of hay in conducting new research work on curing hay under the difficult moisture and weather conditions of Eastern North Carolina. Farmers of Eastern North Carolina sustain great losses of hay each year because of unfavorable weather. Research and demonstration work directed toward developing improved methods for dealing with this situation will be of tremendous financial importance to the State. The installation of this hay drying equipment is an important step toward the development of dairy industry in the southeastern part of the State.

Some work has been done toward improving the roadways of the station. Three wooden bridge-ways have been replaced by 30-inch concrete culverts, and two 12-inch concrete culverts have also been installed. A considerable amount of road grading and ditching has been done.

Since the war much effort has been directed toward improving the mechanical working facilities of the station. Horses and mules have been disposed of, so far as possible, and mechanical equipment has been provided. In the spring of 1948 a pick-up truck was purchased, and in July 1947 an International M tractor was procured for the heavy work of the station. In the spring of 1948, under leasing agreements of the International Harvester Company to promote educational services, one new type model C and one new type Cub tractor were procured. These, with the A tractor purchased a year earlier, gave the station a good assortment of tractor power for the conduct of its work. These tractors have been supplemented by other equipment, one of the most important items of which is an ensilage harvester which will replace a good deal of hand labor during the ensilage harvesting season.

A new grain drill and a lime and fertilizer spreader of modern design have been purchased. A tractor trailer and an all-purpose farm tractor wagon have been secured. While other equipment is needed, these items have supplied the station's most urgent needs for farming equipment. It is hoped that now that the standard has been set, the State will continue to follow the policy of providing the most modern and up-to-date equipment with a view not only to efficient conduct of the State's work, but also demonstrating and testing this new equipment for the benefit of all farmers.

At the end of the period under report a major project of painting has been undertaken as an improvement. At the year end all metal roofs on station buildings have been given a coating of aluminum paint as a preservative and to improve appearances. This is to be followed by painting the buildings a uniform color with a view to freshening up their appearances and preserving them against weathering and decay.

RESEARCH

In spite of war conditions the station succeeded in maintaining its major long time research projects, and during the post-war period we have been broadening these activities and developing new lines of research.

AGRONOMY

Cooperating with the N. C. Agricultural Experiment Station. ROY L. LOVVORN, *Forage Crops;* P. H. HARVEY, *Corn Breeding;* E. E. HARTWIG, *Soybeans.*

Forage Crop Investigations. Investments in phosphate, potash and lime paid big dividends on Dallis grass-Ladino clover pasture tests during 1945. Each dollar invested in phosphate, potash and lime returned $9.00 worth of forage. Omitting limestone from the treatment resulted in a reduction of approximately 2,300 lbs. of dry matter per acre. The loss of 2,971 lbs. was suffered by omitting potash on the pasture treatment, and where the sod received everything needed except phosphate, the yield was 2,987 lbs. less than where the phosphate was included.

These results were obtained from an established stand of Dallis grass and Ladino clover and during a year that was favorable for the clover. In other years the increases have not been as great, but they have been large and substantial. The particular soil was poorly drained, stiff soil not generally considered suited to cultivated crops without mendatory treatment. There are thousands of acres of such land in Eastern North Carolina, much of which is now idle, that could be used to establish excellent permanent pastures if they were adequately fertilized, as in this test, and seeded to Dallis grass and Ladino clover or White Dutch clover and lespedeza. Of course such pastures should not be over-grazed and good drainage should be established.

This experiment included seven clovers in addition to Ladino clover. All were grown in association with Dallis grass and under the six fertilizer treatments. The necessity of phosphate, potash and lime was demonstrated for all of them. All clovers

were better during 1945 than in previous years because of the favorable season, but low hop clover did not rank as high as the Louisiana White or Ladino clovers. It seems to be necessary to graze and mow permanent pastures very closely during the early fall, if low hop clover is to maintain itself in the soil. The combination of high rainfall during the fall of 1944 and the highest mean temperature in March in 40 years, resulted in an unusually good performance of the Subterranean clover. This was the first time during the five years the experiment was in progress that Subterranean clover seedlings germinated in August and continued to grow throughout the fall, winter and spring.

Early experiments indicated greater needs for potash than had been experienced on many other soils or soil regions. The second year's results from a rate of potash study gave response as follows:

100 lbs. muriate of potash every 2 years—5220 lbs. dry matter per acre.

200 lbs. muriate of potash every 2 years—5423 lbs. dry matter per acre.

400 lbs. muriate of potash every 2 years—5728 lbs. dry matter per acre.

600 lbs. muriate of potash every 2 years—6219 lbs. dry matter per acre.

All plots were adequately fertilized with phosphate and limestone and had a good stand of Dallis grass and legumes. The heaviest rate of 600 lbs. every two years resulted in an increase of one and one-half tons of excellent forage and could be considered economical on this poorly drained soil.

These fertilizer-forage crop results were considered so important that it was deemed highly desirable to demonstrate their value. During the last three years of this quadrennial period the station has established a series of demonstration pastures which serve further to prove out the results and information and at the same time afford a particular demonstration of these results for the benefit of the public. The large 23-acre permanent pasture was divided into four demonstrational pastures, and one of these was left in its natural state as a carpet grass pasture. The other areas were seeded to (1) Ladino clover and Dallis grass, (2) Ladino clover, (3) White Dutch clover, lespedeza and Dallis grass. These pastures have been fertilized in accordance with the results of the research plots, and established in 1946. They

have demonstrated in 1947 and 1948 that wonderful permanent pastures are to be had in the Coastal Plain region of Eastern North Carolina, pastures not only of grass but heavy in legume forage. The forage on these pasture areas in the spring has been so great that our dairy herd could not keep it down and it has been necessary to cut the pastures for hay (ensilage). This has been done without any loss; we have had continuous good pasture.

In 1947 the check pasture of carpet grass provided 101 average cow days of grazing per acre. The Ladino clover-Dallis grass pasture yielded twice as much, or 202 average cow days per acre. The Ladino clover alone yielded practically the same as Ladino with Dallis grass, and the White Dutch clover, Dallis grass and lespedeza area also yielded approximately the same as the Ladino and Dallis grass area; namely 201 average cow days per acre. It will be seen, therefore, that all three of these properly treated areas have given twice as much grazing as the check pasture of carpet grass. These results have been so outstanding that there has been a steady flow of visitors—research workers, agricultural instructors, farmers and others—to see the results, and it is believed that this work has already had a tremendous influence on the future of livestock industry and dairying in the Coastal Plain region of the State. Certainly they have proved that under normal weather conditions there is no reason why ample high-quality pasture and forage cannot be made available.

Corn Breeding Work. The corn improvement project has utilized approximately one and one-half acres during each of the four years of the period under report for testing experimental hybrids for adaptation and performance under Southeastern North Carolina conditions. This work is part of the general corn breeding work of the State Experiment Station. A number of the hybrids tested have shown real promise compared with standard varieties. Such hybrids as NC-26 and NC-27 have produced yields ranging between 85 and 100 bushels per acre, and approximately 30 percent more than check standard varieties. In addition to varieties being tested for yield of grain, others have been tested as ensilage corns. Under comparative tests, NC-504 has produced approximately nine tons of ensilage as compared with six and one-half tons of the well known ensilage corn Pamunkey.

To demonstrate the value of these new hybrid corns produced through our corn breeding research work, in the entire test field

here in 1947 there were nearly 100 selections under test in 25-ft. rows and repetitions, and the entire field, including all selections being tested, gave a yield of over 98 bushels of corn per acre. Some of the hybrids tested well over 100 bushels. With the development of these high yielding corns, both yellow and white strains, it is believed that corn will continue to be an even more important crop in the eastern part of the State. A Missouri pioneer extension worker, Sam Jordan, once figured out that the addition of one kernel to every ear in Missouri would provide sufficient wealth to take care of all State educational institutions. If such is true, these very decided increased yields per acre should add enough wealth to the agriculture of Eastern North Carolina to far more than pay for all the costs of research work.

Soybean Tests. Experimental soybean plantings of the Coastal Plain Station, Willard, N. C., have included available named varieties and several hundred selections from the breeding program each year of the period under discussion. Of the varieties grown, Ogden has been a consistent top yielder of good quality beans. Over 1,000 single plant progeny rows and crosses have been grown for observation and selection purposes each year in an attempt to develop better adapted varieties for seed production purposes. Out of these tests, several varieties, such as the Ogden and Roanoke, have been outstanding and have been introduced and made available to the farmers of the State.

Small Grains. The station has continued its program of producing grain crops under Southeastern North Carolina conditions, growing wheat, barley, oats and rye. Results obtained from oats and wheat have been the best from the standpoint of producing feed for use on the station. Barley has given good crops, but it seems to be more susceptible to varying weather conditions. The tests have indicated the use of hormone seed treatments, and hormones in connection with fertilizers have tended to stimulate early development, early maturity and slightly better yields. The yields secured have been considerably above the county and State averages as recorded in the last report.

While we have had good results each year with wheat, the rust disease problem is serious. The research workers are endeavoring to attack this by producing resistant strains, and arrangements have been made with the Pathology Division of the Experiment Station to put under test in 1949 the most outstanding selection of the resistant types in comparison with the standard

variety Redhart as a demonstration of the resistance of the new strain and a yield comparison. It is hoped that we can prove the resistant selection to be so superior that it will put wheat growing in the Coastal Plain region on a firm footing. With good corn, wheat and oats crops, and with good pastures and forage to support livestock, the eastern part of the State will be well fortified against reduced acreages of cotton and tobacco.

Lespedeza. Results from lespedeza tests during the quadrennium have confirmed the statements in the last report. Under dry weather conditions lespedeza seems a complete failure when seeded to grain, and only partially successful when seeded to grazing. In 1946, when the climate was moist throughout the entire spring and summer, lespedeza did well.

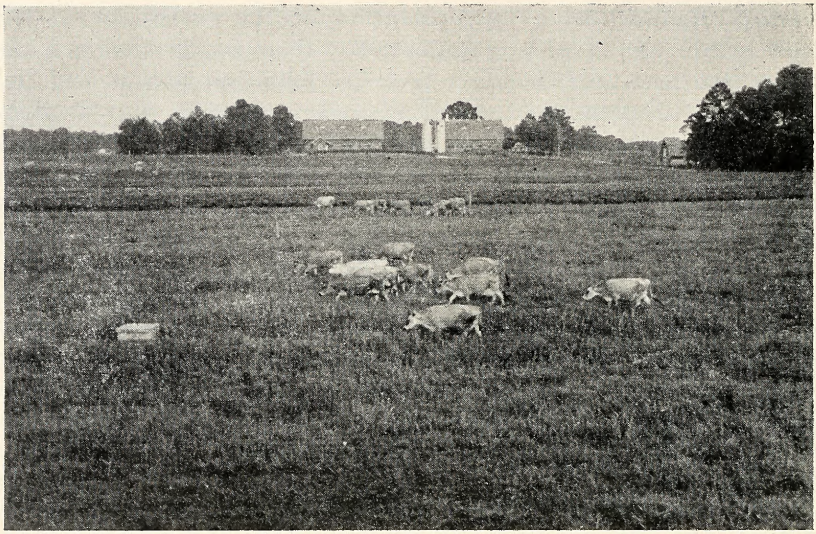
Alfalfa. Alfalfa, with which we have been working as a forage crop, suffered from the wet conditions of the 1946 season. Results up to the present time have been discouraging rather than encouraging. It is still hoped that the key to regular successful alfalfa culture in Southeastern North Carolina will be found. At present, the success we have had with Ladino clover, coupled with the discouraging results with alfalfa, seem to point in a definite direction. Alfalfa, however, has succeeded best in the dryer seasons when Ladino clover would be at its worst. It is desirable, therefore, to try to find the clue to the best methods of producing alfalfa. Certain individuals and certain locations have proven so much more successful than others that it appears that there is still much to be learned.

DAIRY

Cooperating with the Bureau of Dairy Industry, U. S. Department of Agriculture and the N. C. Agricultural Experiment Station.

E. W. FAIRES, J. H. HILTON AND DEAN W. COLVARD.

The dairy project is organized and planned to relate not only to dairying in Southeastern North Carolina, but throughout the entire Coastal Plain region of the southeastern states. The work is closely related to forage crop activities and has as its objective two major investigational problems. The first is the breeding program based upon the established purebred Jersey herd. This program aims definitely to establish and fix the inheritance factor for a high level of production by the use of proved-for-production sires.



General view of experimental pasture paddocks showing five groups of Jerseys grazing on five different pasture paddocks having different crop rotations. Grazed Tift Sudan grass in foreground, followed by lespedeza and soybeans, respectively, in the next two strips.

The second major investigation is the production of annual crops for grazing purposes. These crops are experimentally grazed to determine the grazing season or seasons, the yield per acre of calculated total digestible nutrients, and the cost of production. Coupled with this is the study of legumes, such as alfalfa, lespedeza, Ladino clover, crimson clover, etc., in comparison with these annual crops, and also for the purpose of determining the key to successful production of these legumes under conditions existing in Southeastern North Carolina.

A number of special projects, in connection with the general dairy program of the station, have been undertaken. For example, studies have been made of the use of DDT in the dairy barn and on the milking cows for controlling various flies. A definite program has been conducted relating to the sale and distribution of purebred Jersey bulls throughout the southeastern part of the State for the purpose of bringing about general improvement of the dairy animals of this section. Studies have also been made of the use of milo maize for ensilage and the use of newly selected ensilage corn hybrids. Studies of producing ensilage from legumes, such as soybeans and from legume pasture areas, principally Ladino clover, and studies relating to hay saving under the humid conditions of Southeastern North Carolina, have been undertaken.

A trial using a ration of all southern feed concentrates in comparison with standard feed concentrates was initiated in January 1948, and the first year's test was completed in April 1948. This test will be continued in other years before drawing any conclusions.

Calf Sales. An outstanding result of the dairy program has been the matter of producing and distributing registered Jersey bulls throughout the territory with a view to providing the farmers with better bulls at low cost. Through understandings of the cooperative agencies a fixed scale of prices is established, based upon the production record of the dams and the age of the bull calf. The prices have been fixed low enough so that a farmer cannot afford to purchase a cull bull in contrast to purchasing one of these bulls of high breeding. This program was started in 1940 and has run for eight years through 1947. During this period 120 bull calves have been sold from the herd, going as breeding animals into farmers' hands. The average sale price has been $33.02. It is believed that the influence of this work will become increasingly important and that it is fundamental to the development of the dairy industry in Southeastern North Carolina.

Cows Sold. In addition to bull calf sales, 50 cows have been declared surplus to the project and sold as milking and breeding cows. These have gone, principally, into Duplin, Pender, Wayne and Johnston Counties. Nine cows were also sold for immediate slaughter due to some defects such as sterility or defective udders. In the program of placing fine high-bred Jersey bulls and cows with farmers of the State, the county agricultural agents should have credit for their good cooperation. They have created interest among the farmers of their counties and have come with the farmers to the station for the purpose of advising them as to their individual purchases. This is a fine example of what can be accomplished through cooperation between extension workers and the station in promoting the welfare of agricultural interest in the State.

Eminent's Field Flower. The cow, Eminent's Field Flower, No. 563000, who carried the station herd No. 1, was killed on March 13, 1944, as an act of mercy to prevent the suffering of old age. She was a grand old matron, serving long and well and deserves a place in this report. She was 22 years and two months of age at death. Her last calf was born when she was

Cows grazing on soybeans in an experimental pasture strip at beginning of grazing period.

Eminent's Field Flower, grazing on a temporary soybean pasture at the end of the grazing period.

18 years and eight months of age. During the lactation following the last calf she produced 7074.5 lbs. of milk, 349.5 lbs. of butterfat in 305 days. Her life time production was 127,930.8 lbs. of

milk testing an average of 4.88 percent butterfat or 6245.8 lbs. of fat. She dropped 15 calves in the herd. At one time there were seven of her daughters, 14 grand-daughters and 12 great grand-daughters in the herd of the station. The fine records of the present herd, largely the progeny from this cow, is a further testimonial to her merit.

Herd Production Testing. The herd has been in herd production testing for 15 consecutive years. The American Jersey Cattle Club certificate issued May 31, 1947, for herd improvement testing shows the following herd averages: 19.58 cows in milk, 7,361 lbs. milk, 5.43 percent fat and 400 lbs. fat per cow.

In 1945 the certificate showed 402 lbs. fat, this being the only year the herd exceeded 400 lbs. of fat. Indications are that this year's certificate will show the herd to average approximately 425 lbs., which will be the highest production record yet obtained, evidencing the progress being made through the use of proven sires and good feeding, including pastures containing legumes.

The herd has shown gradual increase in production during the past eight years. In 1940, 23 production records were made in the herd that averaged 6,345.6 lbs. milk, 5.06 percent fat, 320.9 lbs. fat at the average age of 3 years and 8 months. In 1945, 28 production records were made that averaged 8,173.5 lbs. milk, 5.25 percent fat, 429.2 lbs. fat at 3 years and 6 months of age. This increase in production over the five year period report is due largely to the use of proved-for-production sires. During this time two sires were used almost exclusively: Oxfordia Lad of Morrocroft, No. 264447, and May Owl Tidvic Veda Torono, No. 344303. Both of the above named bulls were lost from the herd during the past two years, one by death from foreign bodies in the digestive tract, the other being slaughtered due to injury which left the bull of no further value as a breeding animal.

Oxfordia Lad of Morrocroft was used in the herd five years and 10 months, during which time he sired 92 calves—45 females and 47 males. Twenty-three of his daughters have completed records that average 8,431.2 lbs. milk, 4.56 percent fat and 460.5 lbs. fat. The 23 dams of these daughters have production records that average 8,169.3 lbs. milk, 5.09 percent fat, 415.5 lbs. fat. Thirteen daughters were better than their dams in the total milk produced, 17 were better in percent of fat and 16 in total fat. Nineteen daughters are still in the herd and will be tested for production when they are of milking age.

May Owl Tidvic Veda Torono, the second generation bull, or the one used on the daughters of Oxfordia Lad of Morrocroft, and other foundation cows, was used in the herd some six years, during which time he sired 91 calves—46 females and 45 males. Twenty-seven of his daughters had production records that averaged 9,683.5 lbs. milk, 5.37 percent fat, 519.8 lbs. fat. The 27 dams averaged 8,469.5 lbs. milk, 5.38 percent fat, 456.4 lbs. fat. Twenty-two daughters were, therefore, better than their dams in total milk, 11 were better in percent fat and 19 better in total fat. Four daughters in the herd are yet to be tested.

The records given in the last two paragraphs emphasize the value of these sires and their ability to transmit high butterfat and high milk production.

Phoenix Tiddleywinks Owl, No. 381120, the third generation bull, entered the herd breeding work in May 1945, following the two preceding sires. This bull has 10 daughters with production records that average 8,505 lbs. milk, 5.53 percent butterfat, 467.7 lbs. butterfat. To date this bull has 22 daughters in the herd, but none of them have completed their records.

Use of DDT. DDT has been used during the past four years to gain information on the product for the control of flies and mosquitoes on cattle and around the dairy barns. In the summer of 1945 a five percent solution of DDT was used on the interior walls and stanchions and ceiling in one of the two dairy barns, the one in which the milking is done. In addition a two percent DDT solution was used on the cattle. The barn was sprayed only once, but the cattle were sprayed intermittently through the summer. There is conclusive evidence from the work done that the five percent DDT solution of an emulsion concentrate type spray kills gnats, horn flies, stable flies, house flies, deer flies, and horse flies.

Counts were made on insects killed in the barn following spray applications. It was found that not only were insects killed immediately following the application of DDT, but there was a constant continuing destruction of insects over a long period of time. The spray applied once in May was still effective six months after being applied on the interior barn walls. The spraying of cattle at eight day intervals through the summer showed materials effective at keeping flies off the cattle on pasture as well as in the barn.

The walls and ceiling in the adjoining maternity and calf barn were not sprayed, but cattle in this barn were sprayed inter-

mittently through the summer. This barn showed a marked decrease in population of flies as compared to the condition in preceding years. The spraying with DDT in the adjoining barn undoubtedly greatly reduced the population of flies in this unsprayed barn. On the morning following the original spraying a large number of cockroaches and a small black beetle that frequented itself around the feed rooms were found dead on the milk house and barn floors. (The cockroaches evidently had come from behind clothes lockers in the shower room).

In the summer of 1946 water soluble DDT (a powdered form of DDT which is soluble in water) was tested in lieu of the DDT in oil solution used in 1945. This water soluble DDT is considered safer for use on cattle. So far as could be observed, the results from its use were altogether favorable and comparable with those of the preceding year. In 1947 and 1948 the water soluble DDT was used in the dairy barns as a regularly established practice and undoubtedly its use will be so continued in the future.

The use of DDT in the dairy barns brought about a noticeable reduction of flies around the residences on the station. While testing DDT at the dairy barns, another test was conducted as a demonstration and for the purpose of ridding a kitchen of an infestation of cockroaches. In this demonstration, using 10 percent DDT in powdered form as a dust spray and 5 percent DDT as a liquid spray with oil base, the roaches were put under control but not completely eliminated. The German cockroach is rather difficult to control in this manner. Using DDT at the dairy barns we found fly control to be quite easily handled in the residences by one or two sprayings of the screens, especially the screen doors, and by a minimum use of DDT within the house. Our practice has been to use it on drop light cords where flies tend to light.

HORTICULTURE

Cooperating with the N. C. Agricultural Experiment Station

E. B. MORROW C. F. WILLIAMS.

The horticultural department of the Agricultural Experiment Station has transferred its breeding work with brambles and fruits from the Coastal Plain Station to a station south of Raleigh. It has also closed out its sweet potato research work, transferring this to the same station near Raleigh. Some of the grape research has been transferred to the Tidewater Station near Plymouth,

N. C., and to private vineyards. The principal projects during the period are the strawberry and grape work, but the station has also been used as a base of activities for blueberry research work.

Strawberries: In 1945, 2,891 seedlings were fruited. These included four selfed progenies, one intervarietal cross and nine crosses between selfed lines. Six varieties and 19 selections were tested in a 5 x 5 lattice design and preliminary records were obtained from 12 additional selections growing in duplicate plots. In 1948 approximately 10,000 seedlings were fruited, and during the intervening seasons of 1946 and 1947 an intermediate number of seedlings were tested. Each year the most outstanding seedlings have been selected for further test and have been so tested in 25 ft. rows. As these selections have continued to prove superior they have been continued in the test and have been multiplied in accordance with their promise.

Some exceedingly promising new selections are under test, but at present the selected and introduced varieties Massey and Blakemore are still the best to be grown by the farmers until others may be proved superior. One selection, for example, has

The N. C. brand of strawberries grown and packed at the Coastal Plain Station.

given yield superior to Massey and Blakemore, but it is not as early as these varieties. Selections are studied over a period of five to seven seasons before being introduced. This permits determining their behavior under different conditions so that by the time they are introduced their reactions to all average conditions are pretty well known.

It will be hard to find new selections superior to the fine ones already introduced and being grown by the farmers at the present time with such outstanding success. As an indication of what is being carried on it may be stated that in the selection tests a number of selections have given significantly greater yields. Six out of 31 selections in one season were earlier than Blakemore, and three were later than Massey. No selection or variety was larger than Massey. A total of 93 first selections were continued out of 2,891 seedlings in 1945. The Eleanor Roosevelt and Massey crosses produced a relatively high percentage of promising selections, and crosses using selection No. 640 as a parent have tended to produce high quality and high flavored and rich colored berries.

Brambles. In the bramble work 10 selections of dewberries, five of black raspberries and five of red raspberries have been grown in a plot covering approximately one acre. These selections from the general breeding program have been given a commercial test. The planting also provides a limited stock of plants for propagation. The objectives of the bramble research are (1) the development of varieties of dewberries for commercial plantings for shipping and processing which are high in quality, firm, productive and disease resistant; (2) development of superior home and commercial varieties of red and black raspberries which are adapted to Eastern North Carolina and the Southeastern United States.

Muscadine Grapes. During the four year period investigations with muscadine grapes were reorganized and revitalized as a cooperation project between the North Carolina Agricultural Experiment Station, Bureau of Plant Industry and North Carolina Department of Agriculture. The present objectives are (1) to develop superior varieties of self-fertile and interfertile muscadine grapes, using hermaphrodite varieties already developed and introduced as foundation stock; (2) to develop more rapid and certain methods of propagation; (3) to study cultural practices. For this work the vineyards of this station are being used. These include approximately 15 acres and one

acre of nursery. They contain most of the known named varieties of this fruit in addition to numerous selections from this breeding work. In the 1946 season, 20 different crosses were made using perfect-flowered vines as pollen parents. In addition to this all perfect-flowered varieties were selfed. Additional crosses in about the same extent were made in 1947 and 1948. From this crossing work it is expected to have several acres of seedlings each year from which to make selections.

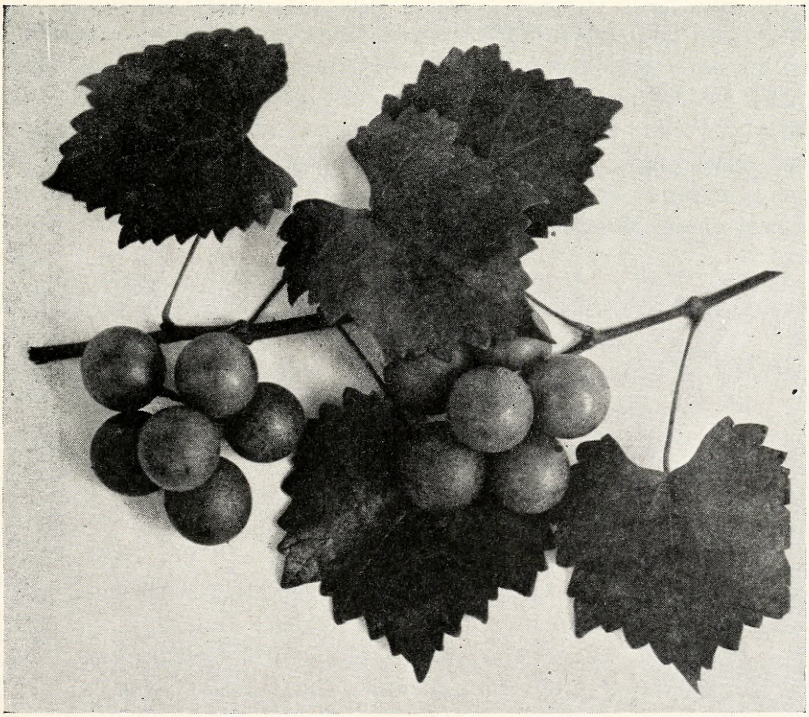
Cultural practices of clean versus sod culture are being investigated, as well as the need of minor element fertilizer.

In the last report the record breaking yields and prices of the 1944 season were reported. In 1945 yields were not quite so good, but the price received was nine cents per pound on the vine so that the net returns were about the same, the price for 1944 having been seven cents. This 1944-45 price yield situation represents probably the peak for all times—the combination of war and commercial conditions with favorable weather and markets. With gross returns per acre of the highest yielding varieties ranging up to $1,000, the returns from muscadine grapes were most attractive as compared to returns the farmers got for tobacco, especially when the amount of work required in the two crops was considered. During the period under discussion the price of grapes has ranged downward slightly, but it is still on a basis which permits attractive returns per acre from this horticulture crop as compared to standard field crops such as tobacco, cotton and corn.

Some interesting information was secured on the growing of intercrops in connection with muscadine grapes. In 1944 a crop of sweet potatoes was grown between the vines. The potatoes were given the same cultural fertilizer treatment as if grown in the open ground and the vines were also given normal fertilizer treatment. We harvested an average of 182 bushels per sweet potato acre or approximately 75 bushels of potatoes per vineyard acre. Only two rows of sweet potatoes were grown in each middle of the vineyard so that the potatoes occupied only two fifths of the total vineyard acre. The quality of the sweet potato crop was excellent and the value of the crop was figured at $262.50 per acre of vineyard. The sweet potatoes, therefore, provided a substantial sum as additional income from the vineyard or as a return to offset the cost of producing the grapes. Pigs were fed on the residue of the sweet potato crop after harvesting. The nine pigs used averaged 55 lbs. at the time they

were put on the sweet potatoes. They were given water and one peck of hog ration daily. They stayed on the sweet potatoes left in the vineyard 37 days, and made a total gain of 655 lbs., or an average gain of 72.7 lbs.

Soybeans for seed have also been grown successfully as an intercrop, bringing an income of about $35.00 per vineyard acre. Since 1946, strawberries have been used as an intercrop and the quality of the strawberries under the vines proves to be even better than the quality of the crop of the same varieties grown in the open. Strawberries selling at the high price of around $12.00 per crate in 1946 brought a handsome return, the profit from which far exceeded the total cost of caring for the grapes and strawberries, leaving the grape crop sale as one hundred percent profit. In 1947 and 1948 while the average price per crate for strawberries was considerably less, the net returns from strawberries under the vines easily covered the maintenance cost for the vineyard.



Fruit and foliage of the Topsail, one of 15 varieties of muscadine grapes introduced in 1946 from breeding work at the Coastal Plain Station in cooperation with the Bureau of Plant Industry.

During the period two publications relating to muscadine grapes, authored by the superintendent of the station, have been issued. One of these, Farmers Bulletin No. 1785, deals with the culture of muscadine grapes and gives general information. The other is Circular No. 769 which formally introduces 15 varieties of grapes which are a result of breeding work in preceding years. Under cooperative arrangements for this project, these bulletins were issued from the U. S. Department of Agriculture and can be obtained on application to that Department.

These new varieties are considered to be definite improvements over varieties previously in existence. Everyone, for example, has rated the Topsail, one of the 15, as a superior table grape to Scuppernong. It is sweeter and equally productive, vigorous and healthy. The most important feature of this introduction of 15 varieties is the fact that six of them are hermaphrodites; that is, perfect-flowered and self-fertile; whereas all varieties previously introduced have been pistillate (female). The pistillate type requires cross-pollination by insects bringing pollen from staminate (male) vines. By producing this new type, which can be used in vineyard plantings in lieu of male vines as pollinators, we have automatically increased the acreage generally by 10 percent. Moreover, the perfect-flowered hermaphrodites have the large bloom structure of the staminate type and, accordingly, they tend to produce a larger fruit cluster. The group includes early, mid-season and late varieties, and varieties of white, red and black colors.

Ornamentals. As part of the horticultural program of the station a project dealing with ornamentals has been developed. The primary purpose of this policy is to learn and practice methods of propagation which would permit the station to produce its own plant material for landscaping and provide its own flowers for interior decorations and public occasions. Somewhat as a personal hobby and side issue, we have accumulated a considerable quantity of valuable plant material. This is growing and developing and insures the station being a more attractive place in the future than it has been in the past. The station now has a very nice collection of Camellia japonica with some very valuable plants, a nice collection of azaleas including the principal types and varieties, a good assortment of German iris, large chrysanthemums and Hemerocallis (day lilies), and a large miscellaneous collection of various other shrubs and flowers of many kinds.

POULTRY

Cooperating with N. C. Agricultural Experiment Station.

R. S. DEARSTYNE C. O. BOLLINGER

In the past a great deal of attention has been given to research pertaining to poultry feeds and their effects. Much has been done in the way of testing various protein feeds, especially those which might be called native or southern feed, such as soybean meal, peanut meal, etc. While some attention has been given to breeding and selection all along, this phase of the work has been particularly stressed during the four year period covered by this report.

This work has as its aim the development of superior families of Rhode Island Red chickens—families having improved all-year-around performance with special emphasis on livability, high rate of production, early sexual maturity and better broiler qualities. The work was done on a small scale at first within the limits of facilities, but with the development of the new poultry plant, described under improvements, it has been possible to step up this breeding work considerably.

At the present time we have two breeder houses and a total of 12 breeder pens, each pen containing eight to 12 hens and a male bird of the best possible breeding. These male birds are secured from other breeders throughout the United States and are selected on their pedigrees, just as a dairyman would select a bull for breeding purposes or a horseman would select a stallion. The hens for breeding are selected from families proven to have a uniform high average performance, including rate of feathering as broilers, age and weight of pullets at first egg, weight of the first egg, adult weights, pauses in production and mortality. The performance of the particular group of hens in relation to all these factors is considered in making selections.

Twelve groups of breeder hens are mated with 12 selected cockerels. The eggs from the hens in these pens are trapnested and records are kept of the number of eggs laid, the number of fertile eggs, the number of dead germs at 18 days and 21 days, and the number of good chicks hatched from each pen. As the chicks hatch in the incubators, in special caged baskets to keep different groups separated from each other, each chick is wing banded to establish its identity. The chicks are then brooded and raised in a normal manner. They are weighed at 12 weeks of age and the pullets and cockerels are separated and rate of feathering is noted. The pullets are put on range until they

are ready to start laying, when they are put in laying houses and individually trapnested to get the individual and family performance as to egg laying, size and amount. Egg weights and body weights are taken for each bird in the fall and in winter, and on the basis of these records a new generation of breeders is selected to go into the breeder pens. In the spring of 1948, 2,100 chicks were hatched and pedigreed and about 800 pullets developed from these chicks will be trapnested the coming winter. Still larger numbers will be handled in future seasons now that the new poultry plant is completed.

When the poultry work was started at this station the flocks averaged less than 200 eggs per year per bird. Following this breeding program, at the present time, the average is close to 300—many birds go over 300, and it is our present ambition to reach the 300 average for the entire flock. It should be remembered that we are not only endeavoring to get high egg production, however, but other improvements as well. Results from this research work are published in bulletin form and issued from the State Experiment Station.

TRUCK CROP DISEASES

Cooperating with N. C. Agricultural Experiment Station.

DON E. ELLIS R. S. COX.

Field studies directed especially toward the diseases of such truck crops as cucumbers, squash, tomatoes, cantaloupes, watermelons and egg plants have been conducted for the purpose of testing various new fungicidal dusts. Some excellent controls have been secured and have not only prolonged the crop, but have aided in procuring higher quality. This work has been carried through especially on cucumbers during the period of this report, and a special publication has been issued which has been directly beneficial to the truck crop interests in the Coastal Plain section where many acres of cucumbers are grown and where there are a number of plants for processing cucumbers into pickle.

ENTOMOLOGY

Cooperating with N. C. Agricultural Experiment Station.

DR. B. B. FULTON.

Some studies have been conducted relating to the corn bud worm and in relation to the red spider on strawberries. The station was able to provide assistance in the outbreak of red

spider in the strawberry season of 1946, which was apparently much appreciated by the growers. The station serves as a source of information in connection with local insect problems and serves as a liaison between the farmer and the specialist at the Experiment Station in developing methods of combatting both insect and disease troubles.

MOUNTAIN EXPERIMENT STATION—WAYNESVILLE, N. C.

HOWARD R. CLAPP, *Assistant Director in Charge*

INTRODUCTION

This report will cover the general development of the farm and progress in research work during the period July 1, 1944 through June 30, 1948.

Although the research program underway at the Station will be discussed, no detailed results will be given as these will be released in bulletin form by the North Carolina Agricultural Experiment Station.

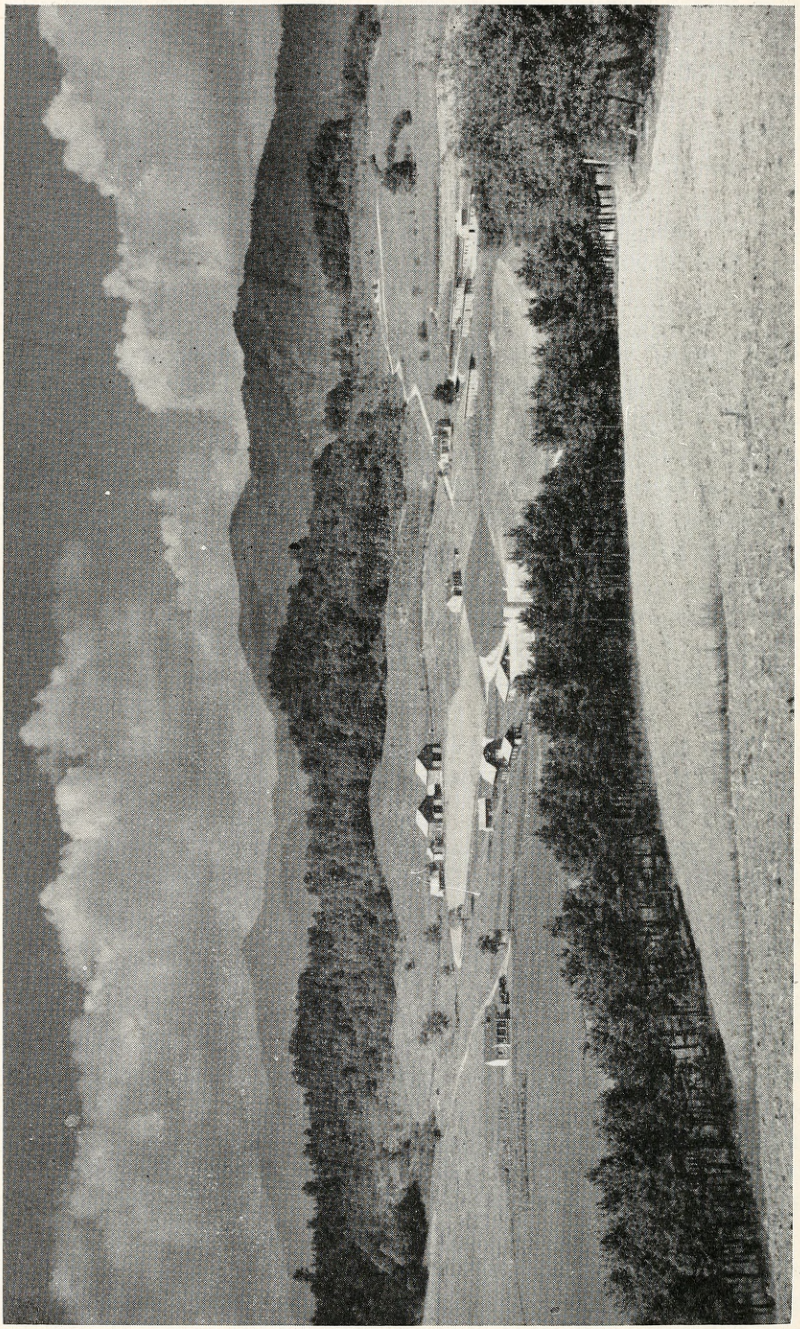
Agencies cooperating in the work at this Station are: North Carolina Department of Agriculture, North Carolina Experiment Station and the United States Department of Agriculture-Bureau of Plant Industry, soils and Agricultural Engineering and Duke University. The Extension Service and other educational agencies have cooperated and have made use of the work and facilities of the Station to further the agricultural program in Western North Carolina.

This farm was purchased June 1, 1944, and the Station was established as of that date. The following will give the physical properties and the development of the physical plant during the period of the report.

LAND

The original area purchased consisted of 282.22 acres. In 1945, through the efforts of local citizens 34.26 acres adjoining the farm were purchased for the establishment of a 4-H Club Camp. In 1947, the J. C. Keeter tract of land, consisting of 72 acres, was leased for five years with an option to purchase at any time during this period. This gives a total of 388.48 acres.

The average elevation of the farm is 2800 feet and the land includes the following soil types: Wehadkee Silt loam, Tate loam, Chewacla Silt loam, Halewood Stony loam, Tate gravely loam, Clifton Clay loam, Rabun Stony Clay loam, Hayesville



General view, Mountain Experiment Station, Waynesville.

loam, Hayesville Clay loam, Halewood loam, Hiawassee Clay loam, Hiawassee Gravely Clay loam, Masada loam, Masada Gravely loam, Congaree Fine Sandy loam, Congaree Silt loam, and Toaxaway Silt loam.

BUILDINGS

The building program on the Station has progressed very well, although it has not been completed. Structures on the farm when purchased which have been remodeled are as follows: foreman's dwelling, two laborer's dwellings, maternity barn for dairy, horse barn, and shop building.

New buildings erected are as follows: laborer's dwelling (cinder block); poultryman's dwelling (brick veneer); dairyman's dwelling (brick veneer); horticulturist's dwelling (brick veener) being used as office; dairy barn with forty stanchions (tile); calf barn (frame); bull barn (cinder block); building for grain, fertilizer and machinery (tile); main poultry building (cinder block); brooder house (cinder block); laying house (cinder block); breeding house (cinder block); range shelters (frame); two burley tobacco curing barns (frame); burley tobacco grading room (frame); and a Turkish curing barn (metal construction).

IMPROVEMENTS

Fencing—The lots around the barns are fenced with oak and locust lumber and are to be painted with creosote white paint. As time and labor is available new woven and barb wire fences are being constructed around all pastures and in subdividing pastures for special treatment and management.

Drainage—There are some drainage problems in the bottom land. Part of this has been drained with 4" and 6" drain pipe. As time and labor is available all creeks and branches on the farm must be opened and straightened for better drainage and handling of excessive amounts of water.

RESEARCH PROJECTS

The following is a brief summary of the research projects that are being carried out on the farm. This work is in cooperation with the N. C. Agricultural Experiment Station, N. C. State College, and with the Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. D. A.

AGRONOMY

Small Grain Breeding and Variety Test (Drs. G. K. Middleton, R. P. Moore, T. T. Herbert and H. C. Cooke) :

Winter Hardiness Studies: In cooperation with the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, units of the Uniform Winter-Hardiness wheat, oat and barley nurseries have been grown. These include 30 varieties of wheat, 30 of oats, and 42 of barley. The above were in triplicated tests.

In addition, duplicate plantings of all varieties and strains of wheat, oats, and barley in the advanced yield test on the Piedmont Branch Station, Statesville, have been grown at Waynesville to obtain information on their ability to withstand cold. This is of real value in the breeding program as often there is little or no winter injury at the Piedmont Station.

Natural Selections: This Station has also been used during the past several years for the growing of bulk hybrid material where it is desired that all the less hardy strains be eliminated. Some promising selections of oats from a cross of Letoria x Fulwin have been obtained in this manner.

Hybrid Corn Test (Drs. P. H. Harvey, R. P. Moore, and H. C. Cooke) : This test includes different strains of hybrid corn which according to the seed law must first be tried before they can be sold in North Carolina. Upon testing they are recommended for general use in the area.

This is a continuation of the breeding program with hybrid corn. Also plots for increasing certain hybrids are made on the farm, these to be put out in field test on this farm and others in the area. Several of the hybrids having highest yields at this Station are in production by farmers of this area. Farmers are becoming informed concerning the proper use of hybrid corns, and more and more are using hybrids to an advantage.

Ensilage Corn Studies: Special studies are being made to determine the best varieties for ensilage. Yields and analyses for total feed values are being compared for all varieties of hybrids and open pollinated corns.

Pasture (Drs. Roy L. Lovvorn and W. W. Woodhouse) : In this work three areas to go into pastures were selected and the following seeding mixtures planted:

Pasture 1—Along Road—Second Bottom
15 lbs. Alta Fescue per acre.
2 lbs. Ladino Clover per acre.

This was seeded late September, 1945, and due to lateness it was decided the clover was not doing well, so it was reseeded in early April, 1946, with two lbs. of Ladino Clover.

Pasture 2—Below Henson House Bottom to Second Bottom
15 lbs. Orchard Grass per acre.
2 lbs. Ladino Clover per acre.

The same was true here as in No. 1, so a reseeding of Ladino was made in early April, 1946.

Pasture 3—Near Pigeon Road Bottom
15 lbs. Broome Grass per acre.
2 lbs. Ladino Clover per acre.

This was not doing well early in 1946, so was torn up to be started again later.

In addition to the above, the large general pasture has been subdivided into five areas in which special treatments and seeding will be made and special grazing will be conducted.

Forage Crops (Drs. Roy L. Lovvorn, W. W. Woodhouse and Chamblee): Alfalfa variety test plots are being conducted to determine the best for this area. Field trials are also underway to study the best of these varieties. Fertilization tests are also being conducted on alfalfa.

Alfalfa, interplanted with grasses, is being studied in plot work, with fertilizer studies on each.

Tobacco (Drs. W. R. Colwell and Luther Shaw): Experimental agronomic studies on burley tobacco were initiated at this Station at the beginning of the period covered by this report. Since this represented a new line of research work on the station, and its initiation occurred during the process of relocating the Station, it was necessary to spend the first several months of the period outlining details of the research program, and assisting in planning, purchasing, and assembling the physical equipment essential to the proper execution of the planned research program.

During this period adequate office and some laboratory equipment was purchased, primarily with Federal funds, and assem-

bled at the Station for use in the project. In addition some new farm equipment, including one light tractor, with plow cultivator, planter, and mower attachments, transplanters, spray machines, and other items, were purchased for use in the work. Other equipment used specifically in connection with the project, but provided by the State, included two burley curing barns, each measuring 41 feet by 48 feet, which provide space for curing approximately six acres of tobacco. In addition, a grading room

General view of one of the Burley tobacco fields with some of the poultry buildings in the background.

measuring 24 feet by 24 feet with an ordering pit of the same size underneath was constructed adjacent to the curing barns.

The general objective of this project is to improve the yield and quality (especially the quality) of burley tobacco through studies of cultural practices and varieties. Specifically, the practices selected for beginning study are as follows: (1) In the plant bed: (a) methods of weed control, and (b) varied rates and sources of fertilizer materials. (2) In the field: (a) effects of varied fertilizer analyses, (b) spacings in both row and drill, (c) varied levels of topping, (d) different methods of harvesting, and (e) varieties on yield and quality.

These experiments necessitate the planting of approximately six acres in burley tobacco each season. Most of these experiments are run in a two-year rotation, using either corn or small grain on the alternate years.

In addition to the major project on burley tobacco, smaller projects have been initiated on aromatic (Turkish) and Rustica types of tobacco.

Commissioner of Agriculture W. Kerr Scott being shown Turkish tobacco work by Superintendent H. R. Clapp and Extension Tobacco Specialist R. R. Bennett, 1947 Tobacco Field Day.

The studies on aromatic types of tobacco are directed toward determining the effects of (1) varied levels of phosphate fertilization and (2) varied dates of transplanting on the rate of maturity, yield, and quality.

The studies on *Nicotiana rustica* tobacco are directed toward measuring (1) the nicotine production of different varieties under conditions of high rainfall and cool nights; and (2) the effects of varied leguminous cover crop, manure, and nitrogen fertilization on the nicotine yield of this type of tobacco.

Animal Industry

Calf Feeding Project (Drs. Dean W. Colvard and R. K. Waugh) : The objective of this project is to study the effects of

limited milk feeding on growth and conditions of young dairy calves. These schedules are being followed:

Schedule I — 7 weeks, using 260 lbs. Milk
Schedule II — 9 weeks, using 361 lbs. Milk
Schedule III—12 weeks, using 537 lbs. Milk

All schedules are getting a calf starter—all they can consume up to 4 lbs. daily plus a good grade of hay at all times. Also, all are receiving 15,000 units of vitamin A and 500 units of vitamin D per day.

General Breeding Studies

Jerseys: The breeding program inaugurated some years ago is still continued. Careful selection is being made, and herd bulls to fit into the predominant blood lines are being used.

The Jersey herd has been classified for type and the following is the summary of all milking animals:

Excellent	— 1	scoring 90 and above
Very Good	— 9	" 85-90
Good Plus	—13	" 80-85
Good	— 2	" 75-80

Guernseys: Since moving the dairy department to the new location, foundation stock of Guernsey cattle has been added. The selection and purchase of seven bred heifers was made possible by a committee of the North Carolina Guernsey Cattle Club. This committee was composed of W. W. Fitzpatrick, Quail Roost Farm, and M. D. McNaughton Farm.

Animals were selected and purchased from the following to date:

A. B. Slagle	Franklin, N. C.
Osborne Farm	Canton, N. C., Route 2
Clear Springs Farm	Concord, N. C.
Arden Farm	Clemmons, N. C.
Klondike Farms	Elkin, N. C.
Quail Roost Farm	Rougemont, N. C.
Sky Brook Farm	Hendersonville, N. C.

A herd bull was purchased from Sky Brook Farm to be used on these animals in the future.

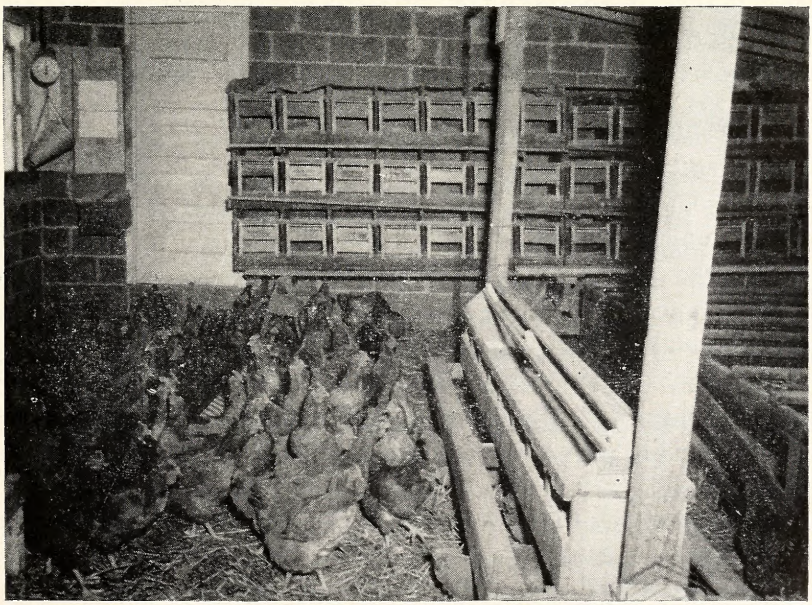
Artificial Breeding: Artificial breeding has been practiced on the herd. Semen collected from own bulls and semen from bulls

at the Biltmore Farms, Asheville, N. C., has been used. All cows are being bred artificially as near as possible in order to bring to a minimum the disease conditions caused by natural breeding.

POULTRY (Drs. R. S. Dearstyne, C. H. Bostian, E. W. Glazener and W. L. Blow) :

Comparison of Crossbred and Purebred Layers: This project is a continuation of that which was carried on during the past few years. The 1944 hatched pullets, 450 in number, were carried through two laying seasons. This was done to see how the production holds up during the second year. 1944 was the first year that this has been done, in that at the new location there is sufficient room to do so. At the present date a large majority of these crossbreeds are still laying a normal rate of eggs.

Development of Inbred Lines: This project was started in the fall of 1944 and the purpose is to develop strains of New Hampshire and Barred Plymouth Rock with superior and uniform broiler qualities and to develop inbred strains of both breeds which can either be combined to yield a desirable cross-breed or



Young pullets in one of laying pens.

used in top crossing. This project is set up to last 10 years with a revision after five years.

In the fall of 1944, males and females of three different strains each of New Hampshires and Barred Rocks were selected for breeding. During the breeding season of 1945, sires of each breed were used with dams in only purebred mating and produced around 1700 progeny in 1946. The progeny was weighed at two, eight, and 12 weeks of age, and a record taken on feather development at each weighing. At 12 weeks of age, measurements of body shape and conformation were made; then culled, with hatchability and vigor of primary consideration. The project is progressing as planned and the results being obtained are very encouraging.

HORTICULTURE

Small Fruit (Drs. M. E. Gardner and E. B. Morrow)

Strawberry Variety Test: This test is an effort to determine the varieties most suitable for this area of North Carolina. Twenty-five varieties were used with yields taken and quality being studied.

Strawberry Spacing Test: Spacing studies are being made on strawberries in special plots. Also special cultural methods are being studied.

Rossberries: Twenty-five rossberry plants were set out to see if they are of economic value in this area.

Vegetables (Drs. M. E. Gardner and Fred Cochran)

Snap Beans: Varieties of snap beans are being studied in special plots. Yields are being taken and quality for fresh market and quick freezing are being studied.

Lima Beans: Varieties of lima beans are being studied in special plots. Yields are being taken and quality for fresh market and quick freezing are being studied.

Tomatoes: Commercial varieties are being studied for late blight resistance. Also, crosses and breeding work from State College are being planted here and studied for late blight resistance.

Lettuce: Variety tests are being run to determine the best one for this area of North Carolina.

Okra: Variety tests are being run to study its economic value and the best one for this area of North Carolina.

Sweet Corn: In cooperation with Dr. P. H. Harvey sweet corn varieties are being studied for the best yield and quality. Sweet corn hybrids as well as open pollinated varieties are being grown.

GENERAL LAND USE

After all of the research projects have been allocated, every effort is made to utilize the remaining land and facilities in farm practices found best for this area.

On the remaining land feed crops are grown for the livestock on the farm. Also profitable cash crops that are grown on a small acreage to demonstrate their value to this area.

Some of the feed crops that are grown on field basis are: Winter oats of the Letoria variety; all of the hybrid corns that are recommended for grain for this area, also the hybrid corns that are suitable for ensilage; Ladino Clover mixed with Orchard Grass, and also mixed with Alta Fescue, for the general pasture; Alfalfa hay for the livestock. The management of this is so carried out as to demonstrate to the farmer that he, also, can grow it.

A drier system located in one of the burley tobacco barns was installed primarily for studies in forced-air ventilation for curing tobacco. During the hay season, this system is utilized in the curing of hay. The quality of hay has been increased at least 25 percent with very little cost per ton increase in handling.

PUBLIC SERVICE

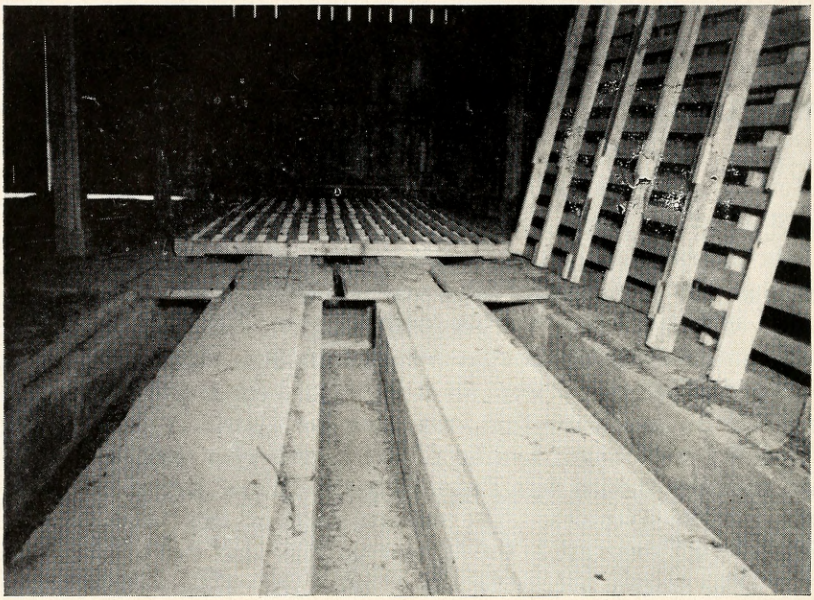
What does all this mean to the farmers of this area, and how are they using it?

Since the farm was established it has been visited by large and small groups of people. Many individual farmers visit, call and write for information on the work being accomplished.

In 1945, 1946, and 1947, the Annual Haywood County Promotional Guernsey Sales were held at the farm. These sales were sponsored by the County Agents, Officers, and the Dairymen of the County.

During the spring of 1946, all of the enrolled 4-H Club boys of Haywood County made a general tour of the farm.

Since the starting of the Veterans Training Program, the farm has been visited by these groups from all the counties in this area. They study the general program, and a great many of the groups return for special studies on a particular line of work.



Hay drier in tobacco barn, showing the inverted duck out slatted floor system.

Hay drier, showing hay in process of drying.

Business men from all over this area visit the farm and study the work in progress. Feed, fertilizer, and seed dealers, especially, have met and visited the farm for study in helping them better to serve their buying public.

Farm groups and others who tour this area of North Carolina have included this station in their schedule of visiting, and have studied the farm problems and progress of this area.

In 1947 and 1948 agronomy students of N. C. State College visited the Station for study of agronomic problems in Western North Carolina.

Classes at Western North Carolina Teachers College at Cullowhee, N. C., have used the Station for study in particular problems related to people and the soil.

SUMMARY

This Station is fast becoming the center of Agriculture in Western North Carolina. The farmers in this area have a lot of problems on their farms. This Station is dedicated to these people to help solve these problems. With the cooperation that has been shown in the past from farmers, business men, professional groups, publicity groups, and others, progress in agriculture will be great in the future.

UPPER MOUNTAIN EXPERIMENT STATION—LAUREL SPRINGS, N. C.

JAMES A. GRAHAM, *Assistant Director in Charge and Agent, U.S.D.A.*

Station established in 1944.

Area of Station, 412 acres.

Soil Types: Alleghany Silt Loam, Clifton, Chewada, Talladega, Watauga Loam, Tate Gravely Loam.

Elevation: 3300 feet above sea level.

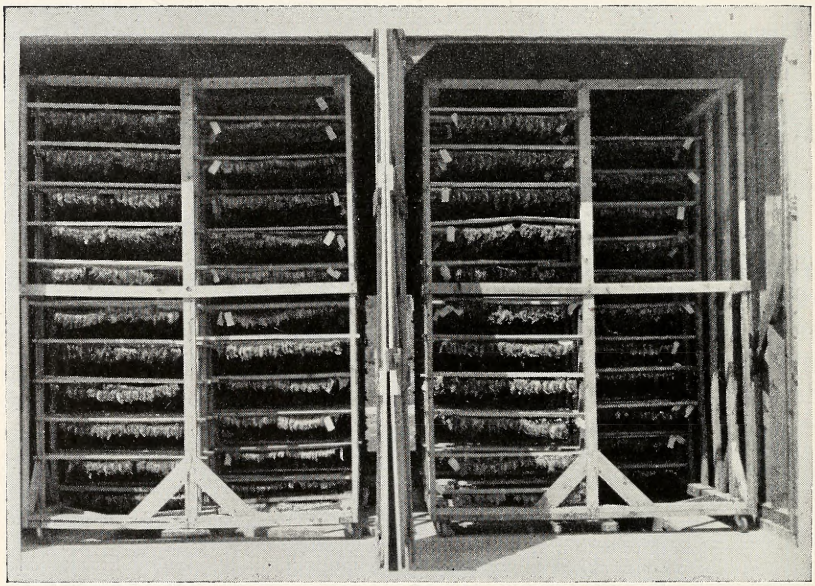
GENERAL

This farm is situated in the northwestern section of the State in Ashe County, near the Alleghany County line. It was established for the purpose of carrying out research with beef cattle and sheep, as well as certain other studies dealing with farming in the higher altitudes; such as horticultural crops, agronomy, Burley and Turkish tobaccos, and pasture studies.

During the past two years extensive work has been carried on to increase the carrying capacity of the permanent pasture by improving fertility through the application of superphosphate and lime. In addition to this, approximately 60 acres have been

cleared and reseeded in Ladino Clover and orchard grass. Twenty-five acres of alfalfa have been seeded for hay which, along with the meadows, will supply sufficient feed.

Much progress has been made on this Station since it was established. The Superintendent's home has been completed; also the herdsman's and three farm laborers' homes. At the present time a small temporary building is being used for an



Curing Turkish tobacco at Upper Mountain Station.

office, but plans are now under way to enlarge this. A toolshed, shop, Burley tobacco barn, Turkish tobacco barn, and the beef cattle and sheep barns have been completed.

A hay drying unit has been installed in the cattle barn to improve the quality of hay and to furnish other information.

Scales have been installed in the cattle and sheep barns to record weights. Cattle pens have been completed which make this barn one of the best in this section of the State.

The sheep pasture has been divided into four sections, all sections enclosed with woven wire fence. The farm itself is practically enclosed by woven wire fence. Wooden fences have been constructed around the barns and along the main highway.

At the present time a concrete stave silo is being constructed, as well as additions to the Burley tobacco barn and office. We are also installing artificial heat in the tobacco barns for curing purposes.

PUBLIC RELATIONS

On March 6, 1946, a sheep production school was held at this Station for the farmers and county agents in all the western mountain counties. All counties were well represented, creating a large attendance. The school was a very successful one and proved valuable to all who attended. It was conducted jointly by the Extension Service, the North Carolina Experiment Station and the Department of Agriculture. Special attention was given to the care and feeding of ewes, and to castration and docking of lambs. It was an all-day affair and lunch was served in the Laurel Springs School. Mr. George W. Litton, V. P. I., Blacksburg, Virginia, was the principal speaker.

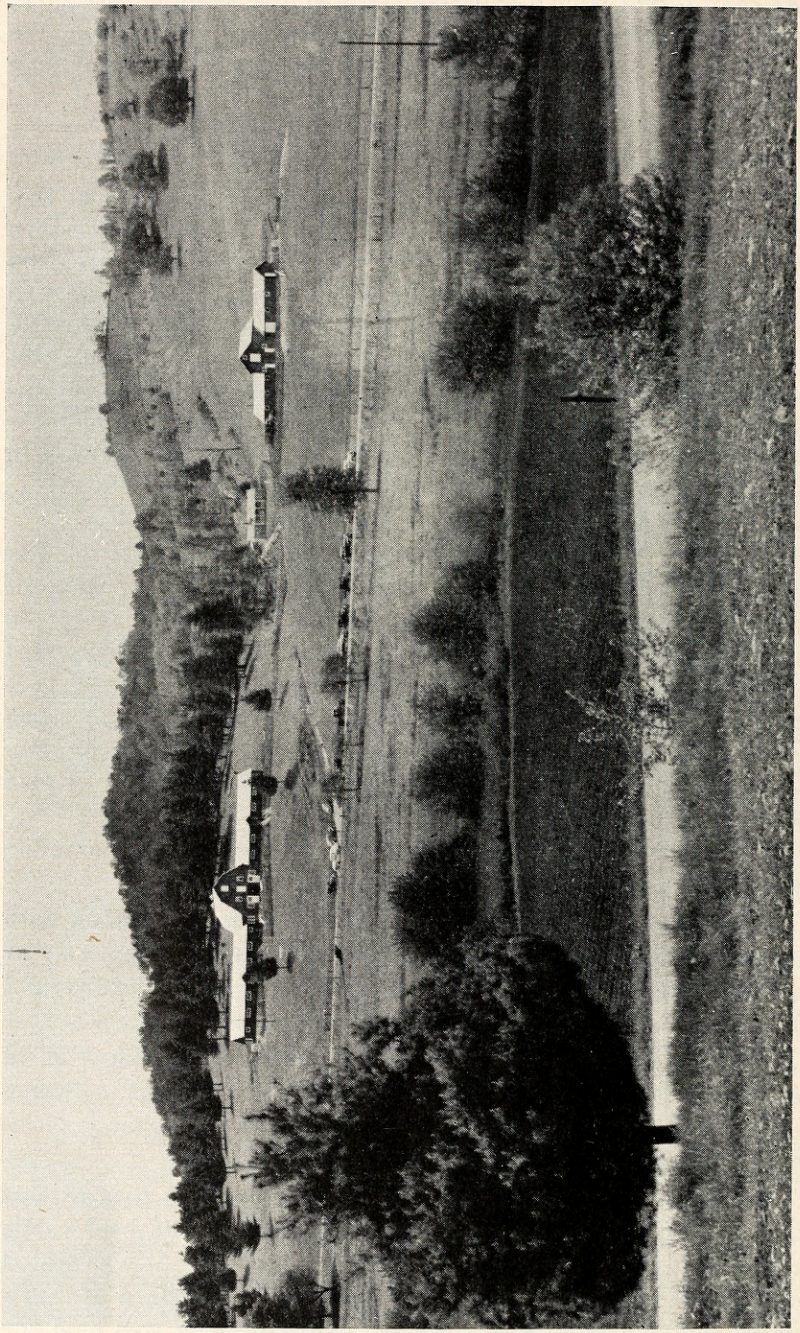
On May 24, 1946, a sheep-shearing school was held by the Extension Service and the Experiment Station for the benefit of Ashe and Alleghany County farmers. A representative of the Sunbeam Co., Chicago, Illinois, was in charge and demonstrated the use of sheep-shearing machines. He also repaired those that were in need of it. In 1947 and 1948 the State Sheep-Shearing Contest for 4-H members was held at this Station with the winners representing North Carolina at the International Livestock Exposition in Chicago.

Public service has been growing as indicated by the many farmers writing or calling by for needed information.

During the past three years this Station has cooperated with farmers of the area in providing facilities for holding a sale of registered dairy cattle, sponsored by the Extension Service and the Ashe County Guernsey Breeders Association.

For the past two years this Station has held a Tobacco Field Day for the farmers of this area. Dr. Luther Shaw was in charge of the program and conducted the tours over the tobacco plots. There were approximately 500 in attendance.

On August 28, 1946, a general field meeting was held at this Station. Due to rainy weather, it was held in the beef cattle barn instead of Scott Grove as originally planned. It was stated that this was the first time in the history of the Board of Agriculture that it met in a cow stable. This meeting was held for

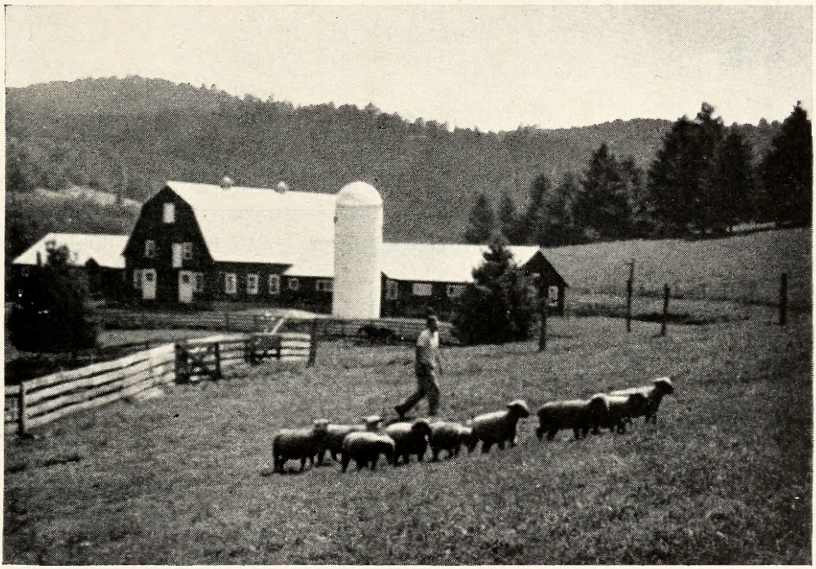


A typical scene on Upper Mountain Station.

the agricultural leaders of the State and the farmers and their wives of this area to inaugurate the work at this Station. Approximately 700 people attended this program.

In addition to these meetings, the Station has had many visitors from this area, mainly the veterans enrolled in farm training.

A natural water system for the farm, to replace the old one, has been completed and is to be used as a model for the mountain area. It was built according to specifications and regulations of the N. C. Department of Health.



Sheep on pasture at Upper Mountain Station.

ANIMAL HUSBANDRY RESEARCH

In cooperation with the N. C. Experiment Station, EARL H. HOSTETLER, JOHN E. FOSTER, AND J. C. PIERCE, JR.

Sheep: The sheep project underway at this station is entitled "Systems of Breeding for the Production of Market Lambs in North Carolina". The objective of this project is to compare the efficiency of the following systems of breeding the ewes and ewe replacement for the production of market lambs:

(a) Mating purebred Hampshire rams to native Hampshire ewes and making ewe replacements from ewe lambs raised.

(b) Mating purebred Hampshire rams to Western ewes and buying replacements.

(c) Crossbreeding, using sires from four breeds in rotation, replacements to be made from ewe lambs raised.
(d) Comparing the economic efficiency of early and late dropped lambs.

The wool clip for the three groups for the 1946 crop was as follows:

The Western ewes averaged 6.67 lbs. per fleece.
The grade Hampshires averaged 5.77 lbs. per fleece.
The purebred Hampshires averaged 5.83 lbs. per fleece.

The Western ewes also weaned 6¼ percent more lambs than the grade Hampshires. Our flock consists of 85 sheep. The anticipated tenure of this project is for a period of 10 years.

Beef Cattle: The wintering project is entitled "Comparison of Meadow Hay Cut at Different Stages of Maturity for Wintering Beef Cattle". This project is not completed and will probably run for from three to five years. The project was initiated in June, 1945. The first year's results were not entirely in accord with the outline for this project, as no grazing data were collected on the aftermath.

The weights of the cattle indicate that there was a rather noticeable difference in the average daily gain of the group wintered on early and late cut hay. The group wintered on the early cut hay lost somewhat less weight than those wintered on

Beef cattle grazing on Ladino clover and orchard grass pasture.

the late cut hay over the wintering period. Grade Hereford cattle were used in this experiment. At the present time this station's herd consists of 72 grade Herefords and one pure bred Hereford bull.

AGRONOMY

Cooperating with N. C. Agricultural Experiment Station

Hybrid Corn Test (P. H. Harvey, R. P. Moore, and Henry Cooke) : During the last two seasons approximately one acre of land has been used in testing corn hybrids. The project name is "Corn Improvement" and has not been completed. The major results obtained are as follows: Most hybrids are mature too late for Ashe County. The corn belt hybrids are about the right maturity but do not seem to be well adapted, primarily due to disease susceptibility. The yellow hybrids best adapted are N. C. T. 1, U. S. 13, and U. S. 282 (late), W. Va. 1163, W. Va. B8, P. A. G. 170 and W. Va. B8 A. In the white hybrids, N. C. T. 20 and Tenn. 10 are best but are late.

Small Grain (Henry Cooke, R. P. Moore) : A small grain test was conducted and several varieties tried. The best varieties of oats proved to be Letoria, Stanton and Forkedeer. Thorne and Fulcaster proved to be the best varieties of wheat.

HORTICULTURE

Cooperating with the North Carolina Agricultural Experiment Station, PROFESSORS M. E. GARDNER, JAMES FRANCIS, AND DR. FRED COCHRAN.

Irish Potatoes (M. E. Gardner and Dr. Fred Cochran: One acre of tuber-unit Sequoia seed was grown under complete isolation. The purpose of this work was to provide a source of disease-free foundation stock for our growers and others in Western North Carolina and in other states. The results of this work were satisfactory and the yields good.

Fifteen hundred Irish potato seedlings were grown in five-hill plots for increase and observation. Notes were taken on the vine and tuber characters and also the susceptibility or resistance of all the seedlings to insect and disease pests.

Duplicates of all of the seedlings planted at Laurel Springs were grown on the farm of Mr. D. C. McCotter at Cash Corner. These seed were placed in a field which is heavily infested with southern bacterial wilt. Varieties that showed susceptibility to wilt were not planted again in 1946.

Growing this seed on the Laurel Springs farm made it possible not only to observe the performance of the seed, but also to provide seed stock for testing in eastern North Carolina for the next year.

In 1948 an isolated increase plot is being grown. This planting is comprised of 190 selected clones two years from true seed. This station will serve as a location for growing and increasing virus-free stocks.

Apples (James Francis): There was an old apple orchard on the farm when it was purchased, consisting of 300 trees of Delicious and Stayman in addition to new varieties set out. This is being prepared for experimental purposes.

During the past year there have been tried out 38 new varieties that have never been used in this area before. The following varieties were used: Alton, Carlton, Close, Cortland, Crimson Beauty, Dunning, Greindale, Kendall, Labo, Lodi, Macoun, Medina, Milton, Newfone, Ogden, Orleans, Redhook, Red Spy, Sweet Delicious, Sweet McIntosh, Webster, York, Glenton, Joan, Lowry, Monmouth Beauty, Monocacy, Red Warrior, Turley, Virginia Beauty, Williams Early Red, Waxparent, Imp Red, Winesap, Red Rome, Gallia Beauty, Grimes Golden, Red Jonathan, and Yellow Delicious. In addition to this, these varieties were grafted to bearing trees in April, 1946: Macoun, Wealthy, Hayes and Yancey.

There has never been an ideal early apple in this area and there is a definite need for apples for early trucking trade. An early apple is a late blooming apple; therefore, due to climatic conditions in which there are many late spring frosts, this is an important factor. At the present time there isn't sufficient pollination, so we are trying to find a satisfactory condition for this.

Mulching is being used and this is proving a better system than the old one of too much cultivation. This prevents soil erosion and aids moisture-holding capacity. It provides potash in a form that potash fertilizers will not give. All approved and recommended sprays and pruning practices are being carried on. A fertilization project has been set up which includes the use of a complete fertilizer, nitrate of soda, lime and phosphate.

Vegetables—Tomatoes and Beans (Dr. Fred Cochran): A small test plot of tomato varieties is in progress to find a blight resistant variety. Blight is a major problem in this area. It is

necessary to keep the ordinary commercial varieties thoroughly dusted or sprayed to prevent almost total loss from late blight. In 1947, several lines were found that have considerable resistance to blight. Those showing the highest degree of resistance are being tested further.

Twenty-two varieties of snap beans were tested in 1947. Several unnamed seedlings from the U. S. Vegetable Breeding Laboratory, Charleston, S. C., showed considerable promise.

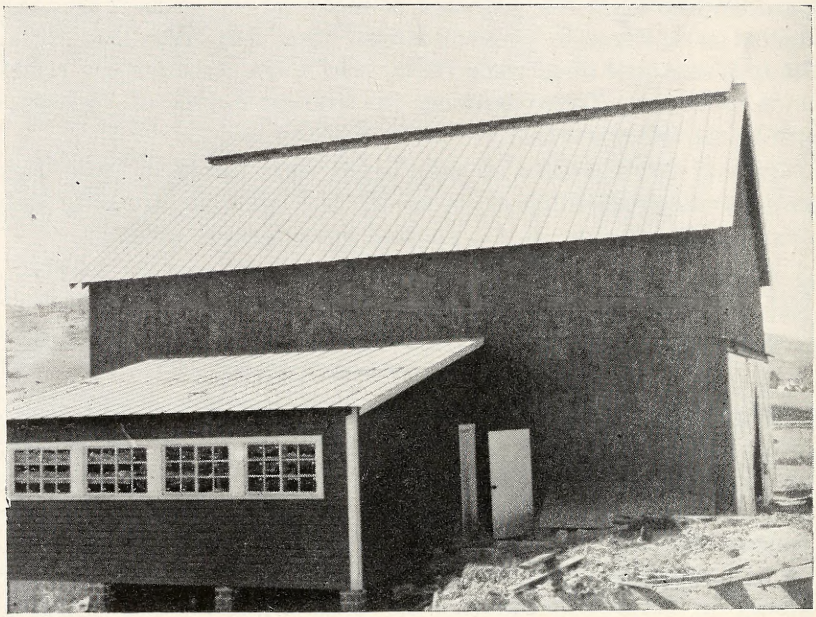
PYRETHRUM

Cooperating with the Bureau of Plant Industry, Soils and Agricultural Emergency, U. S. D. A., A. F. SIEVERS.

Pyrethrum, Chrysanthemum cinerarisefolium, is the source of an important insecticide. The dried flowers when ground and used as dust, or when extracted and used in the form of sprays, are extremely toxic to flies, mosquitoes and other insects. These flowers are imported annually in quantities ranging from 10 to 20 million pounds. Originally obtained from what was then Dalmatia, in Southeast Europe, the crop was later introduced to Japan and that country became the principal source of supply for the United States after World War I. In more recent years a better quality of flowers has been received from Kenya, Africa, and this region was the principal source during the recent war.

Pyrethrum generally grows as a perennial but in the tropics and sub-tropical regions it behaves as an annual or biennial.

The small planting at Laurel Springs was made to determine the adaptation of this crop to the small farms in that section. Approximately 1,800 small seedlings that had been grown from seed in the greenhouse at Beltsville, Md., were set on the southern slope of a hill at that station on June 13, 1946. There was considerable moisture in the ground but the surface was rather dry and the plants were therefore watered as set. The first 13 rows were seedlings from a general lot of seed of no special selection, but the remainder represented a selection made at Shafter, Calif. In that location the type is characterized by unusually straight and sturdy flower stalks which facilitate machine harvesting of the flowers. If they grow normally these plants will develop an extensive root system by fall, and crowns from 6 to 10 inches in diameter. They do not bloom the first season. If they survive the winter the flower buds will develop in late spring and the flowers will open probably about the middle of June.



Burley tobacco barn with grading room.

TOBACCO PROGRAM

Cooperating with the Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. D. A., LUTHER SHAW, *Agronomist.*

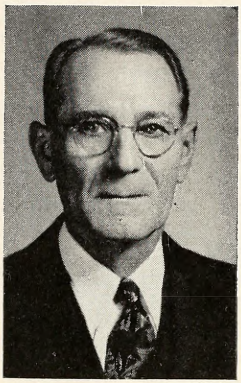
The tobacco program on this station represents a new project, hence considerable time during the biennium was spent assembling equipment essential to proper execution of the project. This consisted primarily of the construction of a burley curing barn 41 feet by 48 feet, which will house approximately three acres of tobacco. In addition, a grading room and ordering pit were partially completed.

Two experiments on Burley Tobacco were established on this farm during the 1945 growing season. One was designed to determine the effects of varied levels of nitrogen, phosphate, and potash on the yield and quality of Burley tobacco. The other was designed to measure the black root rot resistance and the yield and quality of nine varieties and strains of Burley tobacco. It is expected that these experiments will be conducted over a period of years. Since the results of only one season are available at the present time conclusions cannot be drawn.

Beginning with the season of 1945, a project on aromatic tobaccos was established on this station in cooperation with Duke

University. During the biennium a curing barn and other equipment essential for handling this type of tobacco were assembled on the farm. During the 1945 growing season one-half acre of aromatic tobacco was produced, including one-fourth acre of Smyrna, and one-eighth acre each of Samson and Covalla. This tobacco was on relatively fertile land and most of it grew too large for good quality. Since that time we have leased a small plot of land off the farm and the results have been promising. A spacing and fertilization test is in progress now.

Rustica plantings have been initiated at this station. Plots consisting of spacing and fertilization have been set up.



Dr. L. J. Faulhaber

VETERINARY DIVISION

Dr. L. J. Faulhaber

Bang's Disease

Since the completion on July 1, 1942, of the work of Bang's testing all cattle over six months of age in all of the counties in the State, we have continued to test herds that were known to be infected, herds in which it was suspected that infection might exist, herds owned by State and charitable institutions, and herds to which imported cattle had been added. During the period July 1, 1942 to July 1, 1946, we made 517,102 tests, resulting in 4,839 reactors. During the 1944-1946 biennium, we made 253,961 tests, with a total number of Bang's reactors of 2,284. All of these tests were made in the class of herds referred to above.

It will be noted that the percentage of infection is less than one percent, as compared to the national average of 5 percent for 1945. During this period, we retested those counties in which the accreditation had expired and all counties in the State are now fully accredited. We estimate that about 50 percent of these tests and retests were made in herds where infection existed or was suspected.

During this period there was the greatest movement of cattle, both from within and without the State, that we have ever experienced. Our dairy and beef herds were expanded and increased in numbers in an effort to take care of the increased demand for meat and dairy products incident to the war.

Also during this period, a large number of livestock markets started operating, which, with the large number that were already in existence, represented an additional problem in Bang's disease control. This was a period in which many states slowed up their Bang's control program on account of a lack of personnel and one in which vaccination was being widely recommended as a solution of the Bang's problem. This quite naturally has an unfavorable effect on our program in North Carolina.

In October, 1942, we amended our regulations covering the shipping of cattle into this State so as to require such cattle to

come from herds that were negative to Bang's disease. Prior to this time, the regulations required only that the shipped cattle be negative to Bang's disease and we had found from experience that such a regulation resulted in our receiving many Bang's reactors. These regulations were again amended in January, 1946, as outlined by recommendations of the U. S. Livestock Sanitary Association, with a view to making the regulations of the several states uniform. These regulations have since been adopted by most of the states of the nation. North Carolina is still a cattle importing state and these regulations are quite necessary to protect our cattle industry against Bang's disease.

The following is a summary of the Bang's testing done during the 1946-48 biennium, in cooperation with the U. S. Bureau of Animal Industry, and with practitioners participating in the program.

JULY 1, 1946—DECEMBER 31, 1946

No. herds	3,769
No. tested	54,189
No. reactors	561

JANUARY 1, 1947—DECEMBER 31, 1947

No. herds	9,803
No. tested	138,618
No. reactors	1,327

JANUARY 1, 1948—JUNE 30, 1948

No. herds	7,491
No. tested	87,611
No. reactors	737

According to the records of this Division, the following number of cattle were shipped into the State during the 1944-1946 biennium:

1944

Dairy cattle	1,002
Beef cattle	500
Slaughter cattle	1,216

1945

Dairy cattle	1,072
Beef cattle	421
Slaughter cattle	9,751

1946

Dairy cattle	1,361
Beef cattle	200
Slaughter cattle	8,994

During the 1946-48 biennium, the following cattle were imported:

JULY 1, 1946—DECEMBER 31, 1946

Dairy cattle	1,143
Beef cattle	170

JANUARY 1, 1947—DECEMBER 31, 1947

Dairy cattle	1,514
Beef cattle	252

JANUARY 1, 1948—JUNE 30, 1948

Dairy cattle	686
Beef cattle	160

During this two year period, 12,043 slaughter cattle were imported. These cattle were the ones which met the general health requirements for importation into North Carolina. We have no record of the ones which entered this State illegally.

Test and slaughter of reactors has given good, practical results in cleaning up Brucellosis infection in herds of cattle and swine under our conditions. Vaccinating with Strain 19 has been heralded as a panacea. However, with the degree of infection in North Carolina, it is reasonable to assume that the effectiveness of vaccinating in this State is very limited. Vaccinating calves between the ages of four and eight months has given good results in some instances in this State. However, it is estimated that something like five percent of vaccinated calves become permanent reactors. The reaction set up following vaccination in either calves or adults cannot be distinguished, by present known methods, from the reaction produced by natural infection.

In the case of mature animals that are vaccinated, many of them produce a high type of immunity, but at the same time many become permanent reactors. It is estimated that about 50 percent of the cattle vaccinated as mature animals will remain permanent reactors, and some of those that are not permanent reactors, react to some degree for a long period of time. From our experience in this State, we believe that the vaccination of mature animals is not a sound policy except in certain herds where it is impossible, on account of management and other herd difficulties, to eliminate the disease by other known methods.

After the amendment of the Bang's law in 1945, permitting a program of vaccination with Strain 19 vaccine under the supervision of the State Veterinarian, we vaccinated during the year

1945-1946, 331 calves in 28 herds and included adult cattle in vaccinating six other herds. Prior to the amendment of the law, nine herd owners, without advice or consent, vaccinated their entire herds with this vaccine. However, we are of the opinion that vaccination of mature cattle is not sound procedure except in certain isolated cases, knowing that vaccination will mean a high percentage of vaccinated animals becoming permanent reactors.

During 1946-1947, we vaccinated 608 calves in 45 herds and in 1947-1948, 786 calves in 57 herds. During the year 1946-1947, 159 adult cattle were vaccinated, and 96 during 1947-1948. The vaccine has no curative value when used on infected animals. Since Strain 19 contains living organisms, it is capable of producing an abortion in pregnant animals and may spread disease to man. While this Division is concerned with animal health, there is a public health problem associated with Bang's disease, as experimental evidence indicates that the disease may be quite readily acquired by contact with infected animals.

BRUCELLOSIS IN SWINE

Brucellosis in swine is a serious disease, particularly as this strain is highly pathogenic for man. Many people question the blood test as applied to individual hogs. Some feel that it has some merit in the determination of infected versus clean herds. Some testing of swine in State institutions has been conducted. However, a program to clean up Brucellosis in swine is largely dependent upon segregation of pigs at weaning age, putting them on clean ground, and frequently testing young stock so as to raise up replacement animals that are free of the infection. Strict sanitation and good management are essential for a program of this type.

HOG CHOLERA AND OTHER SWINE DISEASES

Cholera continues to be the most important disease of hogs, although there are other infectious and non-infectious diseases that cause considerable loss. Sufficient veterinary personnel are still unavailable to carry out the hog program similar to the one in effect previous to the war. It is desirable that this program be continued, but the budget should be enlarged sufficiently to be able to induce veterinarians to take over this work.

There are serious parasitic and nutritional problems that must be solved if the swine industry is to flourish and grow in this State.

ANTHRAX

No outbreaks of anthrax have occurred during the period covered by this report. Since outbreaks have occurred in previous years, we are recommending to owners of herds of cattle where infection has previously occurred, that they continue vaccinating annually, because anthrax spores remain alive in the soil for a period of years.

CATTLE FEVER TICK

No cattle fever ticks have been found in North Carolina since 1931.

BOVINE TUBERCULOSIS

Tuberculosis control work is carried on in North Carolina through the cooperation of the Veterinary Division and the U. S. Bureau of Animal Industry, with practitioners participating in the program. Our testing is largely confined to herds in counties in which the three year accreditation period has expired; in State owned herds; in herds in charitable institutions; in herds to which imported cattle have been added; and in herds suspected of being infected. The practitioners test many of the herds not coming under the above classification.

During the 1944-1946 biennium, the following T. B. testing was done:

JULY 1, 1944 TO JULY 1, 1945

No. tested	42,103
No. reactors	8

JULY 1, 1945 TO JULY 1, 1946

No. tested	43,872
No. reactors	1

During the 1946-1948 biennium, the following testing was done:

JULY 1, 1946 TO DECEMBER 31, 1946

No. herds	1,387
No. tested	21,901
No. reactors	0

JANUARY 1, 1947—DECEMBER 31, 1947

No. herds	2,699
No. tested	49,369
No. reactors	11

JANUARY 1, 1948—JUNE 30, 1948

No. herds	3,086
No. tested	28,262
No. reactors	1

Tuberculosis in livestock is well under control but it will be necessary to do considerable testing in order to prevent this very serious disease from spreading in livestock and man, as some states had extensive outbreaks recently.

PULLORUM DISEASE IN HATCHERY AND FLOCK INSPECTION AND BREED IMPROVEMENT WORK

As a result of the united effort on the part of the poultry industry in North Carolina and the Veterinary Division, pullorum disease incidence has been reduced to a minimum. Pullorum work has been greatly expanded since the 1945 General Assembly enacted a law placing all hatcheries and flocks selling baby chicks, hatching eggs and turkey poults under the supervision of the Department, and the Board of Agriculture set up regulations to regulate the shipping into this State of these baby chicks, turkey poults and hatching eggs. This enlarged program required additional funds, which the Legislature provided, and it also required a large increase in personnel to take care of this work. For nearly 20 years prior to this time, the work had been done on a voluntary basis. Pullorum infection had been greatly reduced and much had been accomplished in breed improvement, but it was felt that the work should be expanded to cover all hatcheries and flocks which sold their products to the public.

North Carolina operates under the National Poultry Improvement Plan. The Pullorum Tested classification has been eliminated in this State. At the present time, fourteen inspectors and over 200 licensed agents are very successful in keeping pullorum disease incidence to a minimum.

The following table, covering the two bienniums, shows the number of flocks and birds tested, together with percentage of reactors:

CHICKENS

Year	Number Flocks Tested	1st Test Number Birds	% React.	2d Test Number Birds	% React.	Total Samples Tested Including 3d & 4th
1943-44	2,874	722,181	1.31	117,481	0.96	842,750
1944-45	1,835	509,770	0.85	102,986	0.9	612,756—NPIP
1945-46	2,585	797,752	0.81	239,325	0.97	1,124,829—NPIP
1945-46	705	194,107	0.96	58,232	0.79	252,339—Not under Plan
			TURKEYS			
1945-46	75	17,310	5.3	9,389	4.2	27,332—Turkeys

CHICKENS

Year	Number Flocks Tested	No. Birds Tested (1st)	Total No. Tests Made	% React.	Number Free Flocks	Number Clean Birds
1946-47	2304	786,703	121,648	0.41	297	101,573
1947-48	2053	800,298	1,001,546	0.2	1707	798,400

TURKEYS

1946-47 Tube Method	66	14,046	21,880	5.65	.....	.....
1947-48	18	8,793	14,387	0.60	7	8,199

HATCHERY SUMMARY

Year	Number Hatcheries	Hatchery Capacity	Number Chick Dealers	Number State Inspectors	Number Testing Agents
1946-47	239		251	14	200
1947-48	226	11,648,000	265	14	205

The turkey industry in North Carolina has been greatly expanded and much interest is displayed in the elimination of pullorum disease infection from turkey breeding flocks. During the 1947-48 season, the turkey testing was done in the poultry diagnostic laboratory in this Division, by the tube method as recommended by the National Poultry Improvement Plan. The testing program must be continued and emphasized to keep the incidence of pullorum at a minimum figure, particularly in view of the fact that a large number of chickens are imported from unknown sources each year. North Carolina also exports large numbers of chicks, poults, and hatching eggs and these must be maintained free of pullorum for this export business.

RABIES

This Division operates under the Rabies Law as amended, the requirements of this law being carried out by the local county governments. The following table shows the amount of rabies vaccine distributed during the period covered by this report:

Year	Number doses
1944	3,050
1945	3,970
1946	1,600
1947	3,630
1948	2,100

Most of the rabies inspectors secured the vaccine from sources other than this Division.

EQUINE ENCEPHALOMYELITIS

This disease, which affects horses and mules and results in paralysis and death in a short time, has not been very prevalent during the period covered by this report, but some cases have been reported. It is caused by a virus and transmitted to the animal by biting insects. A very satisfactory vaccine has been provided for the prevention of this disease. The disease is more prevalent in coastal counties of North Carolina than in any other section of the State.

POULTRY DIAGNOSTIC LABORATORY

Our poultry diagnostic laboratory was equipped and started operating in June, 1948. This laboratory was established to diagnose poultry diseases in specimens sent to the lab, and field follow-ups are made where necessary. Specimens from practitioners will be accepted for diagnosis and bacteriological examination. This laboratory should be a great aid in general disease diagnosis. We intend to give prompt and efficient service when specimens are submitted.

PUBLIC LIVESTOCK AUCTION MARKETS

We have continued to supervise these markets in accordance with the 1941 law, as amended, although it has been impossible for us to inspect many of the markets regularly on account of not having a sufficient number of veterinary inspectors available to do this work. Recently some of the poultry inspectors have been given a market to inspect each week. This will materially increase the efficiency of our inspection service. There are 45 markets in operation. Where livestock are going through these markets, they are a potential source of disease spreading. Many dealers who frequent these markets are apparently concerned only in making a profit on the animals which they purchase. They attempt to remove animals for immediate slaughter in order to avoid the small fee for testing or vaccinating and later sell such animals to an unsuspecting farmer for feeding or breeding purposes. A close check must be maintained to see that non-slaughter hogs are vaccinated, and that non-slaughter cattle are tested for Brucellosis.

The livestock auction market is a huge disease control problem and more adequate inspection is still needed. The high prices paid and the demand for cattle has encouraged peddlers to truck in cattle from out-of-state without health certificates. Many of

these find their way to these markets in violation of the livestock sanitary regulations. Since their health status is unknown and questionable, it is dangerous to add them to North Carolina herds. Some violators have been apprehended and convictions secured. This has a moral influence on controlling this practice, but more effort in this direction is needed.

MASTITIS

Mastitis is a serious disease affecting dairy cattle throughout the State. It causes economic loss to the dairymen and loss of animals. Many animals affected with mastitis are less profitable producers even though they recover. A thorough study of mastitis indicates that it cannot be controlled by such methods as are used in the control of tuberculosis and Brucellosis. The control of mastitis appears to depend largely upon proper management of the herd, proper treatment, and sanitation of the premises. Several preparations have been found which seem to help correct this condition. However, constant veterinary service and extremely good management are necessary for the control of this disease. With the diagnostic laboratory in operation, it is hoped that funds may be provided whereby the laboratory work may be conducted in this Division for the dairymen and practitioners who are desirous of cooperating in controlling this infection.

ANAPLASMOSIS

Anaplasmosis appears to be on the increase in this State. Research and experimental work indicate that this disease is transmitted by biting insects, and while the death rate is usually not high, recovered animals seem to become carriers. No satisfactory preventative has been found. It is believed that this disease has established itself through the importation of cattle which have been affected with this disease. Most cases of anaplasmosis have been in the Coastal Plains area of the State, although cases have occurred as far west as the Piedmont section.

MISCELLANEOUS

We have continued, as far as possible, to look after the health of livestock on the State owned farms. The greater part of this work consists of vaccinating the hogs, most of which are fed garbage and are, therefore, subject to hog cholera unless properly vaccinated.

It seems that requests for investigation of disease outbreaks over the State are on the increase. All of the requests cannot be taken care of, due to the shortage of veterinary personnel. There are several areas in the State with a rather large livestock population that do not have proper veterinary service. At this time there are at least four counties that are anxious to secure the services of a veterinarian for general practice.

No sheep or cattle scabies, or glanders in horses and mules have been encountered during the period covered by this report.

Johne's disease, or para-tuberculosis, has not been encountered.

The Veterinary Division was host to the Northeastern States Conference of Pullorum Disease Workers on June 12, 13, 14, 1947. Thirty-eight representatives were present from 15 states, the District of Columbia, and from one Canadian province.

PERSONNEL CHANGES AND ADDITIONS

Dr. William Moore, State Veterinarian for thirty years, retired on September 1, 1947 and was succeeded by Dr. L. J. Faulhaber who has also been connected with this Division for about thirty years.

Dr. J. D. Wolf was moved from Hickory to headquarters in Raleigh in September, 1947.

Dr. C. R. Border, formerly with this Department, was re-employed as Assistant State Veterinarian on March 1, 1948, shortly after being released from military service.

Dr. L. M. Greene came with the Department on July 1, 1947 to operate a poultry diagnostic laboratory. After great delay, the equipment for the laboratory has been secured and the laboratory began operating in June, 1948.

A. B. Fairley

WAREHOUSE DIVISION

A. B. Fairley

The State Warehouse System, during the four year period 1944-1948, issued licenses to 90 warehouses, with a storage capacity of 550,000 bales of cotton. This was a small decrease in the number of warehouses licensed and also in the total capacity. The capacity now licensed is ample to take care of the current crop.

The majority of the warehouses which ceased operation during this period were small, unsprinklered warehouses which found it unprofitable to operate, due to high insurance rates and the high cost of labor.

During these two bienniums the licensed warehouses handled over 400,000 bales of cotton each season and the Government sold all of the loan and purchase cotton and most of it has now moved out of the warehouses.

The State Cotton Classer returned from the armed services in September, 1945, and since that time we have been able to render rapid and efficient classing service to cotton producers. Our cooperative agreement with the Federal Government in regard to classing was continued, to the mutual satisfaction of all concerned.

The gin service was reinstated during 1944-1945, but was discontinued in the spring of 1945 because our inspector accepted a position with a gin manufacturing company and it was impractical to employ another inspector at that time.

The warehouse at Norlina was operated through August, 1945, and has since been rented on a monthly basis. The warehouse at Benson was operated through August, 1946, and was then sold at a good profit. The operation of both warehouses brought in revenue.

Several warehouses were licensed for the storage of peanuts the last year of the biennium, and a steady growth of this kind of storage is anticipated.

Substantial payments were made by all warehouses which owed money to the System on account of loans made by the State

on warehouse properties. These loans had been reduced to $165,000.00 by the end of the 1944-1946 biennium, and were down to $139,650.00 by June 30, 1948.

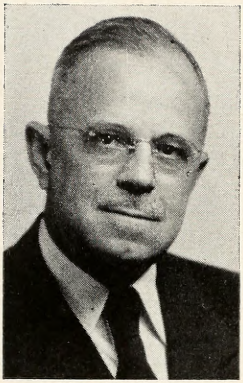
All State bonds were sold at a profit of approximately $90,000.00 and the money was reinvested in Government bonds.

Below are listed the amount of interest collected during the first biennium and the financial statement of the Warehouse System:

Interest.....$51,107.51

FINANCIAL STATEMENT OF THE WAREHOUSE SYSTEM

Cash on Hand Principal Fund	Cash on Hand Supervision Fund	Loans First Mtges.	Invested in Government Bonds
	June 30, 1946		
$82,059.98	$67,740.32	$165,200.00	$482,500.00
	June 30, 1948		
$42,306.07	$63,221.74	$139,650.00	$550,000.00



C. D. BAUCOM

WEIGHTS AND MEASURES DIVISION

C. D. BAUCOM

During the period of 1944-46 four of our regular inspectors were in the armed services, one of which was re-instated and the others went into other fields of activity. The General Assembly of 1944 increased our appropriation so as to employ another inspector and helper and purchase another heavy duty scale testing outfit. Due to war conditions, however, we were unable to purchase and put this truck into service before January 1, 1947.

The following tables show in detail the results of the activities of this division during the two periods covered by this report.

1944-46	Approved	Condemned	Confiscated	Released	Total
Scales	35,472	3,748	191	1,630	41,041
Weights	35,051		531		35,582
Dry Measures	155		9		164
Liquid Measures	1				1
Packages	172,937	49,991			222,928
Deliveries	741	33			774
Kerosene Pumps	391	2			393
All Other	164	4			168
Grand Total	244,912	53,778	731	1,630	301,051

Number of places visited 16,742 Number convictions 32

1946-48	Approved	Condemned	Confiscated	Released	Total
Scales	32,342	3,457	210	1,173	37,182
Weights	37,236		1,309		38,545
Dry Measures					
Liquid Measures					
Packages	126,952	12,061			139,013
Deliveries	1,497	7			1,504
Grand Total	198,027	15,525	1,519	1,173	216,244

Number of visits 19,630
Number of special investigations 155
Number of prosecutions 85

It will be noted that the number of condemnations was on the decrease and the explanation is that during the war no new scales were available and consequently, the users of scales and weighing devices were forced to use what they had and keep them in repair as best they could under the circumstances. You will also note an increase in number of visits during the second period and also an increase in number of convictions. It is our policy not to prosecute if we can remedy the situation by gaining the cooperation of the defendant in assuring us that the violation involved was unintentional and that he will not let it happen again. We, of course, run into some who refuse to comply with the law and we have no alternative other than to let the case go into court.

During the past two years, we have been called on more than ever before to make special investigations dealing with false measure or the use of false measures, such as used in measuring corn, pulp wood, fish, lumber, fruits and vegetables, ice cream, milk, bacon, garden seed, livestock (at auction sales), thread, electricity, sand and gravel, live and dressed chickens, coal, cotton, flour and numerous brands of packaged goods.

We have been considerably handicapped during the last eighteen months due to inability to find a man to operate one of our heavy duty scale testing outfits. During this period we have employed and trained five men who gave up the work soon after the training period because of the low salary allowed for such position.

The last session of the Legislature added greatly to the responsibility and activity of this division by passing two laws, which were placed on this division for enforcement without any additional appropriation. One had as its purpose the reduction of fire hazard in tobacco barns. It was revealed that over two million dollars worth of tobacco barns and tobacco were burning each year, and the purpose of this law was to reduce this fire hazard by requiring all commercial tobacco curers to be approved by this division before same can be sold or installed. This law went into effect September 1, 1947. The Board of Agriculture adopted Regulation 21 dealing with this subject and provided for furnishing an approval tag at a cost of one dollar per barn to the manufacturer. As of June 30 we had collected $11,175.00. The Budget Bureau permitted us to employ five inspectors during the tobacco curing season. The results of such inspections will be given in the next biennial report. The manufacturers, distributors, and farmers all have cooperated beautifully in carrying out the mandates of this law.

The other law enacted by the Legislature deals with the load-bearing strength of concrete and cinder building blocks. It was reported to the Legislature that these blocks had, in some instances, a load-bearing strength of around 500 pounds or less per square inch of gross load-bearing surface. The law set up 700 pounds per square inch as a minimum. As a result of this law and Regulation 22 as adopted by the Board, the load-bearing strength is now running from 1,000 to 1,800 pounds per square inch, and it has not been necessary to prosecute any manufacturer for failing to comply with the law and regulation. So far as I know, North Carolina is the only state which has these two laws.

The enforcement of these new laws was put in this divsion without any provision for increase in personnel, thus adding to the load which is more than our inspectors can carry and accomplish results expected by the law itself. As stated in previous reports, it is impossible to carry out all the mandates of the law placed in this division for enforcement until we have additional personnel. In this regard we should be permitted to employ such additional personnel and purchase such supplies during the tobacco season as the money collected from permit tags will warrant, and said money should be considered as a supplement to the regular appropriation and not as being part of it.

Whereas the Uniform Weights and Measures law, passed by the General Assembly of 1927, has been amended a number of times, and whereas we have many calls for copies of our law and regulations, we, therefore, feel it advisable to have these laws and regulations printed in booklet form so as to be available for any interested party.

Our heavy duty scale testing outfit, which was purchased in 1937 and which has been in constant use ever since, is so badly worn as to make maintenance very costly. Also the large-capacity scales now being purchased and installed in this State, ranging from 20 to 50 tons, require a greater load of test weights in order to make the tests as recommended by the U. S. Bureau of Standards. For these two reasons and some others, we think it advisable to purchase a new piece of equipment.

I wish to commend my co-workers in this division for their loyalty and untiring effort in response to the demands now being made upon them and hope that they may be justly rewarded for such loyalty.

In Memoriam

CHARLES F. CATES

WHEREAS, The State Board of Agriculture lost a valued and highly-respected member when Charles F. Cates died on October 3, 1947, at his home in Mebane; and

WHEREAS, Mr. Cates throughout his long and useful life was active in bettering the welfare of North Carolina farmers and improving agriculture in this State; and

WHEREAS, by his own example and by untiring effort he gave impetus to the program of diversified farming in North Carolina and to increased dairy production; and

WHEREAS, Mr. Cates also founded an industry that has been highly beneficial to North Carolina farmers and an important factor in the economic progress of the State, with its products going far beyond the borders of his native North Carolina and ranking with the best in the nation; and

WHEREAS, Mr. Cates was vitally interested in improving educational opportunities in North Carolina and at all times took an active part in promoting the cause of education and raising it to its present high level in this State; and

WHEREAS, through his patience and understanding, through his loyalty to friends and his upright character, Mr. Cates was recognized as one of North Carolina's finer citizens, public-spirited where the interests of his fellowmen were concerned and devoted to his splendid family and Christian home;

NOW, THEREFORE, BE IT RESOLVED by the North Carolina State Board of Agriculture in official session in Raleigh on January 9, 1948:

1. That we feel a keen sense of personal loss in the death of Charles F. Cates, and we recognize that the State has lost a highly useful citizen who was ever zealous in working for its welfare;
2. That we extend our sincere sympathy to the family of Mr. Cates;
3. That a copy of this resolution be spread upon the permanent minutes of the State Board of Agriculture and that another copy be presented to the family of Mr. Cates.

In Memoriam

LIONEL WEIL

WHEREAS, the people of North Carolina, especially those dependent upon agriculture for a livelihood, have lost an outstanding leader and generous benefactor in the death on February 11, 1948, of Lionel Weil, of Goldsboro; and

WHEREAS, his passing has removed from the State Board of Agriculture a man who for eleven years had given freely of his time, effort and good counsel in furtherance of the wise administration of the Department's program, without once claiming reimbursement of expenses or the per diem remuneration to which he was entitled; and

WHEREAS, Mr. Weil for the better part of a long and full life had devoted much of his time and versatile talents to the improvement of agricultural practices, more especially in the fields of cotton and tobacco production, using his extensive farming properties in experimental scientific research which he himself directed and financed; and had contributed richly to the store of agricultural information through the publication of a number of treatises and books dealing with various phases of agriculture; and

WHEREAS, he had given unstintingly of his time and fortune to numerous public enterprises in the interest of education, religion, good government, and the public welfare, living an exemplary life that was an inspiration to all who were privileged to know and work with him;

NOW, THEREFORE, BE IT RESOLVED by the North Carolina Board of Agriculture in official session in Raleigh on March 15, 1948:

1. That we express our keen sense of personal loss in the death of Lionel Weil and go on record in recognition of his splendid service to agriculture, his State and his country;
2. That we extend our sincere sympathy to the family of Mr. Weil; and
3. That a copy of this resolution be spread upon the permanent minutes of the State Board of Agriculture and that another copy be sent to the family of Mr. Weil.

In Memoriam

HERBERT HUTCHINSON BRIMLEY

WHEREAS: The death of Herbert Hutchinson Brimley has terminated the connection of a notable public servant with this department; and

WHEREAS: Mr. Brimley first came with this board to prepare a fisheries exhibit for the State Centennial Exposition in 1884 and served as the board representative at many international expositions and as an executive of the Museum Division of this Department until his death on April 4, 1946; and

WHEREAS: His long time conscientious and resourceful services have built for the State a leading natural history museum and aided in the conservation and development of our natural resources, and

WHEREAS: This board on June 26, 1941, took cognizance of Mr. Brimley's contributions to his adopted State by naming the extensive museum library as the Brimley Library of Natural History, and

WHEREAS: His genial personality, sense of humor and wisdom of experience placed him in a position of leadership among State workers for many years,

NOW, THEREFORE, BE IT RESOLVED that when this board adjourns on this day, it do so out of respect to the memory of H. H. Brimley, and

BE IT FURTHER RESOLVED that a copy of these proceedings be placed in the records of this board and that a copy be sent to Mrs. H. H. Brimley.

Adopted by the State Board of Agrictulture,
In session in Raleigh, April 23, 1946.

In Memoriam

CLEMENT SAMUEL BRIMLEY

WHEREAS: The death of Clement Samuel Brimley, on July 23, 1946, has terminated the services of a nationally known scientific worker with this Department; and

WHEREAS: Dr. Brimley has worked modestly and effectively as a member of the Division of Entomology since 1919; and

WHEREAS: The results of his research in zoology have been published in "Insects of North Carolina," "Birds of North Carolina," "Amphibians, Reptiles and Mammals of North Carolina," "Poisonous Snakes of the Eastern United States," and a number of other publications with national circulation; and

WHEREAS: Dr. Brimley worked out his own education and has received Honorary Membership in the North Carolina Academy of Science and an Honorary Degree of Doctor of Laws in June, 1939, at the University of North Carolina; and

WHEREAS: His genial personality, sense of humor, and scholarly reflections have been an asset of this Department for many years;

NOW, THEREFORE, BE IT RESOLVED that when this Board adjourns this day, it do so out of respect to the memory of Clement Samuel Brimley, and

BE IT FURTHER RESOLVED that a copy of these proceedings be placed in the records of this Board and that a copy be sent to Mrs. C. S. Brimley.

Adopted by the State Board of Agriculture
In session in Raleigh July 25, 1946.

In Memoriam

FRED EAVES MILLER

WHEREAS, the North Carolina Department of Agriculture lost a valued and highly esteemed employee in the death, on February 22, of Fred Eaves Miller, who, during his twenty-seven years as Director of Test Farms, inaugurated an active program of research in cooperation with State College and the U. S. Department of Agriculture and greatly expanded the test farm program, and was a great force in furthering a cooperative spirit between the North Carolina Department of Agriculture and the North Carolina Agricultural Experiment Station; and

WHEREAS, Mr. Miller, as Secretary-Treasurer of the Southern Association of Agricultural Workers for more than ten years, was active in furthering the interests of all phases of agriculture throughout the South; and

WHEREAS, by reason of his quiet manner and friendly spirit of cooperation, Mr. Miller was both liked and respected by his co-workers within and without the North Carolina Department of Agriculture and by the members of this Board;

NOW, THEREFORE, BE IT RESOLVED by the North Carolina State Board of Agriculture in official session in Raleigh on March 15, 1948:

1. That we feel a keen sense of personal loss in the death of Fred Eaves Miller, and we recognize that the State has lost a highly useful citizen and employee, who was ever zealous in the discharge of his official duties and his responsibilities to the community;
2. That we extend our sincere sympathy to the family of Mr. Miller;
3. That a copy of this resolution be spread upon the permanent minutes of the State Board of Agriculture and that another copy be presented to the family of Mr. Miller.

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